To: Korotney, David[korotney.david@epa.gov]
From: MacAllister, Julia
Sent: Tue 7/28/2015 5:25:49 PM
Subject: FW: Your Comment Submitted on Regulations.gov (ID: EPA-HQ-OAR-2015-0111-1308)
Growth Energy - 2014-2016 RFS Comment with exhibits.pdf

From: Lehn, David [mailto:David.Lehn@wilmerhale.com]
Sent: Tuesday, July 28, 2015 12:58 PM
To: MacAllister, Julia
Subject: FW: Your Comment Submitted on Regulations.gov (ID: EPA-HQ-OAR-2015-0111-1308)

Ms. MacAllister:

I apologize for adding to what is likely a very full inbox already. I am writing to try to correct a clerical error regarding the comment submitted last night for Growth Energy. The confirmation for the submission is below. It appears that the comment was mistakenly submitted as a comment on another comment (by the SDSA), rather than as a stand-alone comment on the proposed rule. Would it be possible to correct this so that Growth Energy's comment is treated as a stand-alone comment? If you need additional contact information or other information, I would be happy to provide it. For your convenience, I have attached the comment, as well.

Thank you for your assistance.

--David

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Agency: Environmental Protection Agency (EPA)
Document Type: Rulemaking
Title: Comment submitted by John Horter, President, South Dakota Soybean Association (SDSA)

Document ID: EPA-HQ-OAR-2015-0111-1308

Comment:
I am submitting the attached comment for Growth Energy. - Tom Buis, CEO, Growth Energy.

Uploaded File(s):

- Growth Energy - 2014-2016 RFS Comment with exhibits.PDF

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Growth Energy Comments on EPA's Proposed Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017

Docket # EPA-HQ-OAR-2015-0111

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July 27, 2015

TABLE OF CONTENTS

I. INTRODUCTION AND EXECUTIVE SUMMARY 1

II. BACKGROUND 4

A. The Renewable Fuel Standard Program 4

B. EPA's Prior Proposal For 2014 6

C. EPA's Current Proposal For 2014-2016 9

III. EPA'S PROPOSED RENEWABLE FUEL VOLUME REQUIREMENTS WOULD THWART THE GROWTH OF RENEWABLE FUEL FOR YEARS, CONTRARY TO CONGRESS' INTENT AND EPA'S STATED GOAL 12

A. EPA's Proposed Volume Requirements Would Not Drive Growth In Renewable Fuel Through 2016 14

B. EPA's Proposed Volume Requirements Would Enable EPA To Continue To Stifle Growth In 2017 And Beyond 15

IV. BECAUSE THE AMOUNT OF RENEWABLE FUEL IS ADEQUATE FOR OBLIGATED PARTIES TO MEET THEIR STATUTORY OBLIGATIONS AFTER THE PROPOSED CELLULOSIC WAIVER FLOW-THROUGH, EPA MAY NOT USE ITS GENERAL WAIVER AUTHORITY TO FURTHER REDUCE THE RENEWABLE FUEL VOLUME REQUIREMENTS 17

A. The General Waiver Provision Accounts Only For The Amount Of Renewable Fuel Available To Obligated Parties, Not The Amount Of Transportation Fuel Available To Consumers 18

1. The statute's text and structure show that "supply" means the supply of renewable fuel available to obligated parties 18

2. EPA's proposed interpretation contravenes the purpose of the RFS program 24

3. The legislative history makes clear that "supply" means the amount of renewable fuel available to obligated parties 27

B. There Is Adequate Supply Of Renewable Fuels To Meet The Statutory Requirements Reduced No Further Than The Proposed Cellulosic Waiver Flow-Through In 2014-16 28

1. Ethanol supply 29

2. Biomass-based diesel supply 29

3. Renewable fuel supply is sufficient to meet statutory levels after the cellulosic waiver flow-through 31

V. EVEN IF EPA'S INTERPRETATION OF THE GENERAL WAIVER PROVISION WERE VALID, EPA COULD NOT INVOKE THAT AUTHORITY TO REDUCE THE RENEWABLE FUEL VOLUME REQUIREMENTS FURTHER THAN THE PROPOSED CELLULOSIC

WAIVER FLOW-THROUGH BECAUSE SUPPLY WOULD STILL BE ADEQUATE 32

A. Existing Infrastructure Could Support Substantially More Distribution And Consumption Of E85 33

B. Infrastructure Could Readily Be Expanded To Support Even More Consumption Of E85 In 2016 37

C. Infrastructure Could Readily Be Expanded To Support Significant Consumption Of E15 In 2016 41

1. Distribution constraints 43

2. Infrastructure expansion plan 46

3. Consumption constraints 47

4. EPA should take additional actions to facilitate greater expansion of E15 distribution and consumption 50

D. Combining Infrastructure Expansion For E85 And E15 Could Readily Support Even Greater Consumption Of Ethanol In 2016 52

E. Existing Infrastructure Could Support The Distribution And Consumption Of Nearly The Entire Supply Of Biomass-Based Diesel 52

F. Sufficient Ethanol And BBD Could Be Delivered To Meet The Statutory Renewable Fuel Volume Requirements After The Proposed Cellulosic Waiver Flow-Through Even Under EPA's Erroneous Interpretation of "Supply" 54

VI. APPLYING VOLUME REQUIREMENTS WITHOUT A GENERAL WAIVER WOULD NOT BE UNREASONABLE UNDER THE CIRCUMSTANCES 56

VII. AT A MINIMUM, EPA SHOULD ADJUST ITS PROPOSAL TO ACCOUNT FOR HIGHER PROJECTED GASOLINE CONSUMPTION 59

VIII. AT A MINIMUM, EPA SHOULD ADJUST ITS PROPOSAL TO CORRECT ITS TREATMENT OF EXPORTED ETHANOL 60

IX. AT A MINIMUM, EPA SHOULD TREAT CARRYOVER RINS AS SUPPLY FOR PURPOSES OF THE GENERAL WAIVER PROVISION 60

A. EPA Must Treat Carryover RINs As Supply When Determining Whether There Is "Inadequate Domestic Supply" For Purposes Of The General Waiver Provision 61

1. A RIN "buffer" would not work as EPA intends 62

2. RINs are a statutorily prescribed measure of supply 63

3. EPA's proposal to exclude carryover RINs from consideration would subvert the RFS program 64

4. EPA's "buffer" approach to carryover RINs is foreclosed by the statute's provision of other forms of "flexibility" 64

B. Properly Accounting For The Carryover RIN Bank Would Require Higher Total Renewable Fuel Volume Requirements Than EPA Proposes 66

X. ADHERING TO THE STATUTORY VOLUMES WOULD BETTER ACHIEVE THE BENEFITS CONGRESS SOUGHT 67

A. The Statutory Volumes Would Continue To Encourage Critical Investment In Renewable Fuels, Whereas The Proposed Volumes Would Discourage It 68

B. The Statutory Volumes Would Benefit The Environment More Than EPA's Proposed Volumes 71

C. The Proposed Volume Requirements Would Harm The Economy, Especially In Rural Areas 73

D. Adhering to the Statutory Volume Requirements Would Not Appreciably Raise Retail Gasoline Prices 75

E. Adhering to the Statutory Volume Requirements Would Have Minimal Effect On Feed Prices and Retail Food Prices 77

F. The Proposed Waiver Would Impede The Nation's Path To Energy Independence 79

XI. CONCLUSION...80

I. INTRODUCTION AND EXECUTIVE SUMMARY

Growth Energy respectfully submits these comments on the Environmental Protection Agency's proposed rule entitled "Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017."[1] Growth Energy is the leading association of ethanol producers in the country, with 86 members and 66 affiliated companies who serve the Nation's need for renewable fuel. Growth Energy has participated in each of EPA's major rulemakings implementing the Renewable Fuel Standard ("RFS") program, including EPA's first attempt to set volume obligations for 2014. Growth Energy has been a strong supporter of national strategies to promote the use of renewable fuel and to improve the efficiency of domestic biorefineries. For the reasons set forth below, Growth Energy urges EPA to change course and to refrain from issuing a general waiver that is unauthorized, unnecessary, and counterproductive. EPA should not decrease the 2014, 2015, or 2016 statutory requirements for renewable fuel, other than through its cellulosic waiver authority.

Through the Energy Independence and Security Act of 2007 ("EISA"), Congress expanded and strengthened the RFS program in order "[t]o move the United States toward greater energy independence and security" and "to increase the production of clean renewable fuels."[2] Since then, the RFS program has been an overwhelming success. It has created American jobs, revitalized rural America, injected much-needed competition into a monopolized vehicle-fuels market, lowered the price at the pump, reduced greenhouse gas emissions, and made our nation more energy independent and secure by reducing our dependence on foreign oil.

"Congress expected the RFS program to compel the industry to make dramatic changes in a relatively short period of time."[3] Accordingly, EPA recognizes here that "the proposed volume requirements are … intended to drive significant growth in renewable fuel use beyond what would occur in the absence of such requirements."[4] But by that measure, this proposal is a total failure. If EPA persists with its proposal, this rule would halt meaningful growth in renewable fuels and eviscerate the RFS program. The resulting stagnation in renewable fuels would contravene Congress's intent and disserve the public interest.

EPA has proposed to exercise its cellulosic waiver authority under 42 U.S.C. § 7545(*o*)(7)(D)(i) to reduce the 2014, 2015, and 2016 volume requirements for cellulosic biofuel and to flow those reductions through to the volume requirements for advanced biofuel and renewable fuel. EPA also proposes to invoke the general waiver authority under 42 U.S.C. § 7545(*o*)(7)(A)(ii) to further reduce the 2014, 2015, and 2016 volume requirements for renewable fuel based on a purported "inadequate domestic supply" in those years.

Despite appearances, EPA's proposal will not spur growth in renewable fuel in 2015, 2016, or beyond. Because of the large bank of carryover Renewable Identification Numbers

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[1] 80 Fed. Reg. 33,100 (June 10, 2015).

[2] Pub. L. No. 110-140, 121 Stat. 1492 (Dec. 19, 2007).

[3] 80 Fed. Reg. at 33,118.

[4] *Id.* at 33,109.

("RINs"), obligated parties will be able to fully comply with their proposed renewable volume obligations merely by maintaining their 2014 levels and drawing down the RIN bank. Obligated parties will have a strong incentive to do just that, especially because EPA's proposal will trigger its authority to "reset" all the volume requirements for renewable fuel going forward—and EPA's current proposal and prior 2014 proposal leave little doubt that it will use that authority to establish new volume obligations that will not push the industry to expand and that will thus diminish the value of banked RINs. In fact, there is a strong basis to conclude that EPA specifically and improperly set the proposed 2015 and 2016 renewable fuel volume requirements in order to trigger its reset authority. Not only are those volumes remarkably close to the trigger threshold, but also EPA's Acting Administrator for Air and Radiation, testifying before Congress shortly after the proposal was issued, explained that "[w]e actually think it makes a lot of sense to focus a reset on all volumes at one time."[5]

The proposed volume requirements fall far short of the Nation's current supply of renewable fuel, even though they exceed historical production. Even under conservative estimates, the available supply of ethanol and biomass-based diesel alone will exceed the statutory volume requirement for renewable fuel by at least one billion ethanol-equivalent gallons, after the proposed flow-through of the cellulosic waiver, in each of the three covered years. Indeed, the proposal effectively concedes this: "[A]lthough at least for 2014 and possibly 2015 and 2016, there is no shortage of ethanol and other types of renewable fuel that could be used to satisfy the statutory applicable volume of total renewable fuel, there are practical and legal constraints on the ability of ethanol to be delivered to and used as transportation fuel by vehicles."[6]

The fundamental problem with EPA's approach is that constraints on the *distribution and use of transportation fuel* do not matter in determining whether EPA may exercise its general waiver authority. The phrase "inadequate domestic supply" in the general waiver provision refers to the amount of renewable fuel available for obligated parties to comply with their volume obligations, which is properly measured by production capacity. By expanding "supply" of "renewable fuel" to include downstream constraints on the supply and consumption of a different product that contains renewable fuel (that is, blended transportation fuel), EPA in effect interprets "supply" of "renewable fuel" to include "demand for renewable fuel." That stretches "supply" far beyond what reasonable interpretation permits.

In any event, there is adequate "supply" in 2014, 2015, and 2016, even under EPA's flawed interpretation, to foreclose EPA's exercise of the general waiver authority. As this comment explains in detail, there are various feasible, relatively inexpensive, and fast pathways to expand distribution and consumption of ethanol-based renewable fuels and biomass-based diesel. Even the most conservative of these pathways could boost distribution and consumption of renewable fuel by hundreds of millions of gallons—more than needed to support compliance

[5] Testimony of Janet McCabe, EPA Acting Administrator for Air and Radiation, before Committee of the U.S. Senate on Homeland Security and Government Affairs, Subcommittee on Regulatory Affairs and Federal Management, at 23 (June 18, 2015), *at* http://www.cq.com/doc/financialtranscripts-4711934?6&search=1E4v24rR.

[6] 80 Fed. Reg. at 33,113.

with the statutory volume requirements for renewable fuel in 2014-2016, after the proposed cellulosic waiver flow-through.

At its core, EPA's proposal rests on a fundamental misunderstanding of the RFS program as Congress designed it. The RFS program forces innovation and investment by intentionally requiring future levels of renewable fuel use far higher than what can be achieved with present production capacity, distribution capacity, and technology. The proposal, by contrast, ignores this mandate and instead only looks backward, setting volumes based on *existing* capacity to produce, distribute, and use renewable fuel. Under EPA's approach, distribution constraints and weak demand become a self-fulfilling prophecy.

That would be lamentable for the United States. Renewable fuel is an American industry that promotes energy independence, improves our nation's environment, supports hundreds of thousands of jobs (especially in rural areas), and reduces prices at the pump, all without appreciably raising the price of food or feed. Yet EPA would stunt this industry by capping demand for its product and forcing the industry to idle production and identify export markets for excess capacity. That is particularly strange given that EPA's proposed advanced volume requirement would encourage significant importation of sugarcane ethanol from Brazil.

Therefore, the final rule should adhere to the statutory volume requirements for renewable fuel, reduced by no more than the proposed cellulosic waiver flow-through, as follows:

- 2014—17.08 bil gal;
- 2015—17.90 bil gal;
- 2016—18.40 bil gal.

These volumes would properly reflect supply regardless of whether EPA correctly interprets the general waiver provision to refer to the amount of renewable fuel available for obligated parties to comply with their volume obligations, or incorrectly interprets it to refer to the amount of blended transportation fuel that can be delivered to vehicles that can use it.

At a minimum, however, EPA should raise its proposed renewable fuel volume requirements to account for three factors:

- The Department of Energy's latest projections for nationwide gasoline consumption imply a higher E10 blendwall in 2015 and 2016 than EPA's proposal assumes.
- When computing 2014 net D6 RIN generation, EPA erroneously assumed that a D6 RIN was generated on all 846 mil gal of exported ethanol and that all of those RINs would be retired and unavailable for compliance, when in fact much of that volume did not generate a RIN, including hundreds of millions of gallons of un-denatured ethanol. Thus, EPA not only got 2014 wrong, but also understated the market's already-proven generation capacity by hundreds of millions of RINs per year, an error that affects its proposal for 2015 and 2016 as well.

- EPA is required to treat banked RINs as supply when determining the level at which "supply" would be "inadequate" for purposes of the general waiver provision. In other words, EPA must set the renewable fuel volume requirements high enough to ensure that the RIN bank is consumed.

Unless EPA takes these actions, the oil industry will have little incentive to make the investments needed to expand the production and use of renewable fuel that Congress intended the RFS program to achieve.

II. BACKGROUND

A. The Renewable Fuel Standard Program

Congress revised the Renewable Fuel Standard ("RFS") program in 2007 "[t]o move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government."[7] To achieve these goals, Congress required that "gasoline sold or introduced into commerce in the United States … contain[] the applicable volume of renewable fuel," and charged obligated parties—such as gasoline refiners—with meeting those volume requirements.[8]

By mandating the amount of renewable fuel that is blended into transportation fuel, Congress sought to stimulate greater production of renewable fuels. These mandates ensure renewable-fuel suppliers a market for their products, which encourages suppliers to make costly investments in production facilities. The RFS also indirectly stimulates greater *consumption* of transportation fuels that contain renewable fuel. Obligated parties, having acquired and blended renewable fuel, have a strong economic incentive to find an outlet for the resulting blended transportation fuels and, consequently, to invest in renewable-fuel infrastructure to reduce their compliance costs.[9]

The statute uses market signals to translate its quantitative mandates into action. Specifically, Congress directed EPA to create a "credit program" to enable obligated parties to comply as efficiently as possible, either by blending renewable fuel themselves or by buying credits, called RINs, from others who do.[10] As volume obligations become more difficult to achieve, RIN prices rise accordingly, creating an incentive to invest in infrastructure so that obligated parties can comply with their obligations by generating RINs rather than buying them. High RIN prices also permit blended fuels to be sold at a lower effective price to the consumer—

[7] EISA, 121 Stat. 1492; *see Monroe Energy, LLC v. EPA*, 750 F.3d 909, 911-912 (2014).

[8] 42 U.S.C. § 7545(*o*)(2)(A)(i) & (iii); *see* 40 C.F.R. § 80.1406(a)(1).

[9] *See Monroe Energy*, 750 F.3d at 919.

[10] 42 U.S.C. § 7545(*o*)(5).

the blender is able to discount the blended fuel by the amount earned from the sale of the accompanying RIN.[11]

Both aspects of the RFS program—increasing production of renewable fuels and their consumption via transportation fuel—therefore depend on properly calibrated economic incentives. And those incentives derive from properly ambitious volume obligations, as Congress envisioned when it chose the statutory volumes.

In three principal ways, Congress charged EPA with playing an important role in establishing applicable volumes and thus the incentives needed to achieve Congress's goals. First, EPA annually converts the volume requirements into a percentage of gasoline that is projected to be sold or introduced into commerce in the United States, called renewable volume obligations ("RVOs").[12]

Second, EPA must set volume requirements after the statutory schedule expires. The applicable volumes define minimum amounts of four nested categories of renewable fuel: cellulosic biofuel; biomass-based diesel ("BBD"); advanced biofuel, which contains cellulosic biofuel, BBD, and other advanced biofuels; and renewable fuel, which contains advanced and conventional renewable fuels.[13] For cellulosic biofuel, advanced biofuel, and renewable fuel, "[t]he volumes increase progressively through 2022; thereafter, EPA, rather than Congress, will set the applicable volumes"[14]; for BBD, the volumes increased progressively through 2012.[15] Thereafter, the annual applicable volumes are to be determined by the EPA, "in coordination with the Secretary of Energy and the Secretary of Agriculture, based on a review of the implementation of the program during calendar years specified in the tables, and an analysis of" six factors.[16]

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[11] *See generally* Edgeworth Economics, *Impact of the RFS Mandate on Motor Fuel Volumes and Prices, 2014-2016* (*"Impact on Motor Fuel Prices"*) (July 27, 2015) (attached as Exhibit 1); Bruce Babcock & Sebastien Pouliot, *Price It and They Will Buy: How E85 Can Break the Blend Wall*, Iowa State University CARD Policy Brief 13-PB 11 (Aug. 2013), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/13pb11.pdf.

[12] 42 U.S.C. § 7545(*o*)(3)(B) (EPA must publish annual RFS obligations before November 30 of the preceding year).

[13] *Id.* § 7545(*o*)(2)(B)(i).

[14] *Monroe Energy*, 750 F.3d at 912.

[15] 42 U.S.C. § 7545(*o*)(2)(B)(i).

[16] *Id.* § 7545(*o*)(2)(B)(ii). The factors are: (1) the impact of the production and use of renewable fuels on the environment; (2) the impact of renewable fuels on the energy security of the United States; (3) the expected annual rate of future commercial production of renewable fuels; (4) the impact of renewable fuels on the infrastructure of the United States; (5) the impact of the use of renewable fuels on the cost to consumers of transportation fuel and on the cost to transport goods; and (6) the impact of the use of renewable fuels on other factors, including job creation, the price and supply of agricultural commodities, rural economic development, and food prices. *Id.*

And third, EPA may waive an applicable statutorily prescribed volume requirement under certain limited circumstances. First, for any year "for which the projected volume of cellulosic biofuel production is less than the minimum applicable [statutory] volume …, as determined by the Administrator …, the Administrator shall reduce the applicable [statutory] volume of cellulosic biofuel … to the projected volume available during that calendar year."[17] For any year in which EPA exercises its cellulosic waiver authority, it "may also" flow the waiver through to the enclosing volume requirements, i.e., "reduce the applicable volume of renewable fuel and advanced biofuels requirement … by the same or a lesser volume."[18] Second, "in consultation with the Secretary of Agriculture and the Secretary of Energy," EPA "may waive the [statutory] requirements … in whole or in part … by reducing the national quantity of renewable fuel required" based on a determination that (i) "implementation of the requirement would severely harm the economy or environment of a State, a region, or the United States" or (ii) "there is an inadequate domestic supply."[19] EPA may exercise this general waiver authority "on petition by one or more States, by any person subject to the requirements of this subsection, or by the Administrator on his own motion."[20]

Under certain circumstances, exercise of waiver authority will empower EPA to also "reset" the statutory volume requirements going forward before the statutory schedule expires. If EPA waives at least 20 percent of a particular volume requirement in two consecutive years *or* at least 50 percent of a particular volume requirement in a single year, EPA "shall promulgate a rule … that modifies the applicable volumes [for that category of renewable fuel] … for all years following the final year to which the waiver applies."[21] EPA must promulgate such a rule within one year after issuing the waiver that triggers the reset.[22] When resetting volume requirements under this authority, EPA must adhere to the same process that governs the setting of volume requirements after 2022, including determining the new levels in coordination with the Secretaries of Energy and Agriculture, and based on a review of the implementation of the RFS program to date and on an analysis of six statutory factors.[23]

B. EPA's Prior Proposal For 2014

On November 15, 2013, EPA proposed RVOs for 2014.[24] The proposed RVOs were derived from volume requirements that were, for the most part, substantially below the statutorily prescribed levels. EPA explained that it was proposing to exercise its waiver authority to reduce the volume requirements.

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[17] *Id.* § 7545(*o*)(7)(D)(i).

[18] *Id.*

[19] *Id.* § 7545(*o*)(7)(A).

[20] *Id.*

[21] *Id.* § 7545(*o*)(7)(F)(ii).

[22] *Id.* § 7545(*o*)(7)(F).

[23] *Id.*; *see id.* § 7545(*o*)(2)(B)(ii).

[24] 78 Fed. Reg. 71,732 (Nov. 29, 2013).

In particular, EPA proposed to exercise its cellulosic waiver authority to reduce the volume requirement for cellulosic biofuel from the statutory level of 1.75 bil gal to 17 mil gal to reflect its projection of the volume of cellulosic biofuel production.[25] Although EPA recognized that "total biodiesel production by the end of 2013 could be as high as 1.7 bill gal," and that biodiesel plants had "total operating capacity of 2.1 bill gal per year,"[26] EPA proposed to set the applicable 2014 volume for biodiesel at 1.28 bil gal, slightly above the statutory level of 1.0 bil gal.[27] EPA next proposed to flow the cellulosic waiver through to reduce the advanced volume requirement from 3.75 bil gal to 2.2 bil gal.[28] Finally, EPA proposed to exercise its general waiver authority to reduce the renewable fuel volume requirement from 18.15 bil gal to 15.21 bil gal.[29]

EPA's proposed exercise of its general waiver authority was based on its determination that there was "inadequate domestic supply." EPA interpreted that prong of the general waiver provision to permit consideration of not just the supply of renewable fuels produced but also "factors affecting the ability to distribute, blend, dispense, and consume those renewable fuels," including the so-called E10 blendwall.[30] The E10 blendwall refers to "the volume of ethanol that could be used if all gasoline contained 10% ethanol and there were no higher level ethanol blends."[31] In EPA's view, sufficient ethanol could not be distributed and consumed in 2014 to achieve the statutorily prescribed level.[32]

During the comment period, Growth Energy submitted a comment on EPA's 2014 proposal. Growth Energy identified numerous fundamental flaws in EPA's proposed exercise of its general waiver authority and the proposed renewable fuel requirement, including:

- EPA's proposal would undermine Congress's goal of using RFS volume requirements to spur rapid growth in the production and use of renewable fuels.[33]

- EPA could not exercise its general waiver authority because the supply of ethanol, as measured by production capacity, was sufficient to meet the statutory renewable fuel requirement.[34]

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[25] *Id.* at 71,738-71,751.

[26] *Id.* at 71,752.

[27] *Id.* at 71,752-71,754.

[28] *Id.* at 71,754.

[29] *Id.*

[30] *Id.* at 71,755.

[31] 80 Fed. Reg. 33,100, 33,126.

[32] *Id.* at 33,104.

[33] Growth Energy, Comments on EPA's Proposed 2014 Standards for the Renewable Fuel Standard Program, Dkt. # EPA-HQ-OAR-2013-0479 ("Growth Energy Prior Comments on 2014 RFS"), at 16-18 (Jan. 28, 2014).

[34] *Id.* at 10-11.

- EPA incorrectly interpreted the general waiver provision to mean that in determining whether there is inadequate domestic supply, EPA could consider not just the capacity for producing renewable fuels, but also the capacity for distributing and consuming them.[35]

- Even under EPA's erroneous interpretation of the general waiver provision, it could not exercise that authority because supply was still adequate.[36]

- EPA substantially understated the volume of E85 that could be distributed and consumed in 2014.[37]

- EPA should not have disregarded the potential for distributing and consuming E15 in 2014.[38]

- EPA understated the amount of biodiesel that could be produced and consumed in 2014.[39]

- EPA erred in failing to account for the sizeable RIN bank when determining whether supply was adequate, instead setting the renewable fuel volume requirement low enough to preserve a RIN "buffer."[40]

- Even if EPA could preserve a RIN buffer, EPA had failed to articulate any basis for setting the buffer at the chosen level.[41]

- EPA's proposal would have numerous adverse consequences, including harming corn farmers and the ethanol industry, setting back the development of second-generation renewable fuels, increasing energy dependence, raising retail gasoline prices, and harming the environment.[42]

In December 2014, EPA announced that it would not be finalizing the 2014 RFS rule in 2014, effectively withdrawing the proposal.[43] EPA subsequently explained that it had "concluded that the approach in the November 2013 proposal, projecting volume growth into the

[35] *Id.* at 11-19.

[36] *Id.* at 19-44.

[37] *Id.* at 22-30.

[38] *Id.* at 35-43.

[39] *Id.* at 43-44.

[40] *Id.* at 30-35.

[41] *Id.* at 35.

[42] *Id.* at 45-50.

[43] 79 Fed. Reg. 73,007 (Dec. 9, 2014).

the-then future, was not an appropriate way to set standards in late 2014, for a year that was largely over."[44]

C. EPA's Current Proposal For 2014-2016

On May 29, 2015, EPA officially withdrew the November 2013 proposal and released a new proposal for 2014, 2015, and 2016, which it formally issued for comment on June 10.[45] Table 1 summarizes EPA's proposed volume requirements.

Table 1: EPA Proposed Volume Requirements[46]			
	2014	**2015**	**2016**
Cellulosic biofuel	0.033	0.106	0.206
Biomass-based diesel	1.63	1.70	1.80
Advanced biofuel	2.68	2.90	3.40
Renewable fuel	15.93	16.30	17.40

All numbers in billions of gallons (volumetric)

EPA said its task was "to determine the maximum volumes of renewable fuel that can be expected to be achieved in light of supply constraints."[47] "Because 2014 has passed," EPA proposed 2014 volume requirements that "reflect the actual supply in 2014."[48] "For 2015 [EPA] similarly propos[ed] to take into account actual renewable fuel use during the time that has already passed."[49]

With respect to cellulosic biofuels, EPA explained that it was exercising its cellulosic waiver authority to reduce the applicable volume requirements for 2014-2016. According to EPA, net 0.033 bil RINs for cellulosic biofuel were generated in 2014, and so it proposed to set the volume requirement at that level for that year.[50] EPA then proposed slightly increasing volumes for 2015 and 2016 based on its assessment of current and projected production capacities.[51]

With respect to BBD, EPA proposed to set the 2014 volume requirement equal to the 2014 net RIN generation, and then to increase that amount by about 100 mil gal (volumetric) per

[44] 80 Fed. Reg. at 33,104.

[45] *Id.* at 33,100, 33,104.

[46] *Id.* at 33,105, Table I.A-3.

[47] *Id.* at 33,105.

[48] *Id.*

[49] *Id.* at 33,108.

[50] *Id.* at 33,107.

[51] *Id.*; *see also id.* 33,138-33,146.

year through 2017.[52] EPA acknowledged that there could be substantial volume of BBD above these levels, but reasoned that "establishing the volumes at these levels will encourage BBD producers to manufacture higher volumes of fuel that will contribute to the advanced biofuel and renewable fuel requirements, while also leaving considerable opportunity within the advanced biofuel mandate for investment in and production of other types of advanced biofuel with comparable or potentially superior environmental or other benefits."[53]

EPA then proposed to flow the cellulosic waiver through to reduce the statutory advanced biofuel and renewable fuel volume requirements.[54] Although EPA did not say so explicitly, it is evident that it would flow the cellulosic waiver through only partially because the proposed cellulosic waivers are greater than the proposed waivers of the advanced levels. Specifically, EPA proposed to reduce the cellulosic requirement by 1.717 bil gal in 2014, 2.894 bil gal in 2015, and 4.044 bil gal in 2015, but to reduce the advanced requirement only by 1.070 bil gal in 2014, 2.600 bil gal in 2015, and 3.850 bil gal in 2016.[55] EPA then proposed to also flow the cellulosic waiver through to the renewable fuels requirement for all three years by the same amounts as to advanced.[56]

EPA also proposed to use its general waiver authority in two ways: "in a supplemental fashion with respect to the volumes [it] propose[s] waiving using the cellulosic waiver authority, [and] as the sole authority for [further] reductions [in] total renewable fuel" volumes.[57] In EPA's view, the general waiver provision is "ambiguous" and "is reasonably and best interpreted to encompass the full range of constraints that could result in an inadequate supply of renewable fuel to the ultimate consumers, including fuel infrastructure and other constraints. This would include, for instance, factors affecting the ability to produce or import qualifying renewable fuels as well as factors affecting the ability to distribute, blend, dispense, and consume those renewable fuels in vehicles."[58]

According to EPA, the principal limitations on supply so understood are the E10 blendwall and the apparent barriers to surmounting it: "The decrease in total gasoline consumption in recent years which resulted in a corresponding and proportional decrease in the maximum amount of ethanol that can be consumed if all gasoline was E10, the limited number and geographic distribution of retail stations that offer higher ethanol blends such as E15 and E85, the number of FFVs that have access to E85, as well as other market factors, combine to place significant restrictions on the volume of ethanol that can be supplied to vehicles at the present time."[59] EPA therefore explained that it "believe[s] that limitations in production or

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[52] *Id.* at 33,133, 33,136.

[53] *Id.* at 33,106; *see also id.* at 33,136.

[54] *Id.* at 33,110-33,111.

[55] *See id.* at 33,122.

[56] *Id.* at 33,110.

[57] *Id.* at 33,111.

[58] *Id.*

[59] *Id.* at 33,109.

importation of qualifying renewable fuels, and factors that limit supplying those fuels to the vehicles that can consume them, both constitute circumstances that warrant a waiver ….”[60]

Apart from the E10 blendwall, however, EPA did not attempt to quantify the effect of any of these apparent restrictions. EPA proposed to base the 2014 renewable fuel volume requirement on the actual net RIN generation for that year.[61] EPA determined its proposed renewable fuel volume requirements for 2015 and 2016 by attempting to predict how much growth of fuels other than E10 "is within reach of a responsive market" based on past levels.[62]

For 2015, EPA proposed to set the renewable fuel requirement 370 mil gal above the proposed 2014 level. "Much of the increase from 2014"—about 220 mil gal—"would result from the increase in the advanced biofuel standard of 2.90 billion gallons" (compared to 2.68 bil gal for 2014).[63] Thus, EPA's 2015 proposal implies that conventional renewable fuels would grow by 150 mil gal from 2014, to 13.4 bil gal, instead of to the statutorily implied level of 15.0 bil gal. EPA declared that this growth "is possible" because in 2014 renewable fuel grew by 390 mil gal.[64]

Turning to 2016, EPA observed that because obligated parties "will have the full compliance year to respond to the standards [EPA] set[s] for 2016, … the supply of renewable fuels to vehicles can grow more dramatically in 2016 than in 2015."[65] Specifically, EPA proposed to grow total renewable fuel in 2016 by 1.1 bil gal, 500 mil gal of which would come from growth under the advanced volume requirement, "while the remainder (the non-advanced portion)" would grow by 600 mil gal, to 14.0 bil gal, instead of to the statutorily implied level of 15.0 bil gal.[66]

In EPA's view, because the proposed 2016 advanced biofuel and renewable fuel volume requirements "represent significant increases from 2014, … it would be unreasonable to expect the market to supply more than the proposed volumes."[67] But EPA offered no analysis of whether more could be supplied to consumers. Instead, it tried to determine whether these modest proposed increases are "achievable."[68]

To do this, EPA began with the E10 blendwall. Relying on gasoline projections by the Energy Information Administration ("EIA") issued in May 2015, EPA projected the E10

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[60] *Id.* at 33,109-33,110.

[61] *Id.* at 33,121.

[62] *Id.* at 33,122-33,123.

[63] *Id.* at 33,122.

[64] *Id.*

[65] *Id.* at 33,123.

[66] *Id.*

[67] *Id.* at 33,126.

[68] *Id.*

blendwall at 13.78 bil gal for 2015 and 13.69 bil gal for 2016.[69] Although "the E10 blendwall is a function of several factors, some legal, and some market-driven," EPA stated that it "believe[s] that [the market] can respond to the standards we set to drive the use of higher ethanol blends, the E10 blendwall notwithstanding."[70] EPA's 2016 proposed renewable fuel volume would require 0.84 bil gal of renewable fuel above the E10 blendwall, after accounting for non-ethanol cellulosic biofuel and the required level of BBD.[71] EPA identified several "options … to the market to fulfill the need for 0.84 billion gallons," including increasing BBD beyond the proposed standard, increasing importation of sugarcane ethanol, and increasing corn ethanol.[72] However, EPA concluded that "[e]fforts to increase the use of ethanol beyond the blendwall is primarily a function of the volume of E85 that is consumed, since volumes of E15 are likely to continue to be small in 2016."[73] Admitting that it "cannot … predict how the market will choose to meet [the proposed] requirements," EPA presented "a range of possibilities" using the various market options it identified, all based on 100-600 mil gal of E85.[74]

Finally, although EPA estimated that after 2013 compliance, there will be a "bank" of "approximately 1.8 billion [carryover] RINS,"[75] it "propos[ed] not to count those RINs as part of the 'supply' for 2014 or later years."[76] EPA explained that it would be prudent, and would advance the long-term objectives of the Act, not to set standards for 2014, 2015, and 2016 so as to intentionally draw down the current bank of carryover RINs," so that obligated parties could keep these banked RINs to "address[] significant future uncertainties and challenges."[77]

III. EPA'S PROPOSED RENEWABLE FUEL VOLUME REQUIREMENTS WOULD THWART THE GROWTH OF RENEWABLE FUEL FOR YEARS, CONTRARY TO CONGRESS' INTENT AND EPA'S STATED GOAL

As EPA recognizes, "Congress expected the RFS program to compel the industry to make dramatic changes in a relatively short period of time."[78] To accomplish this, the statute mandates that annually increasing levels of renewable fuels be blended into transportation fuel. The proposal repeatedly expresses EPA's apparent belief that its proposal accomplishes Congress's goal by creating necessary market incentives. For example, EPA says: "Because the standards that we are proposing would compel the market to supply higher volumes than would

[69] *Id.* at 33,115, Table II.A.5-1.

[70] *Id.* at 33,126.

[71] *Id.* at 33,127.

[72] *Id.*

[73] *Id.* at 33,126.

[74] *Id.* at 33,127.

[75] *Id.* at 33,130. Excess RINs can be carried over into the next compliance year. 42 U.S.C. § 7545(*o*)(5)(D).

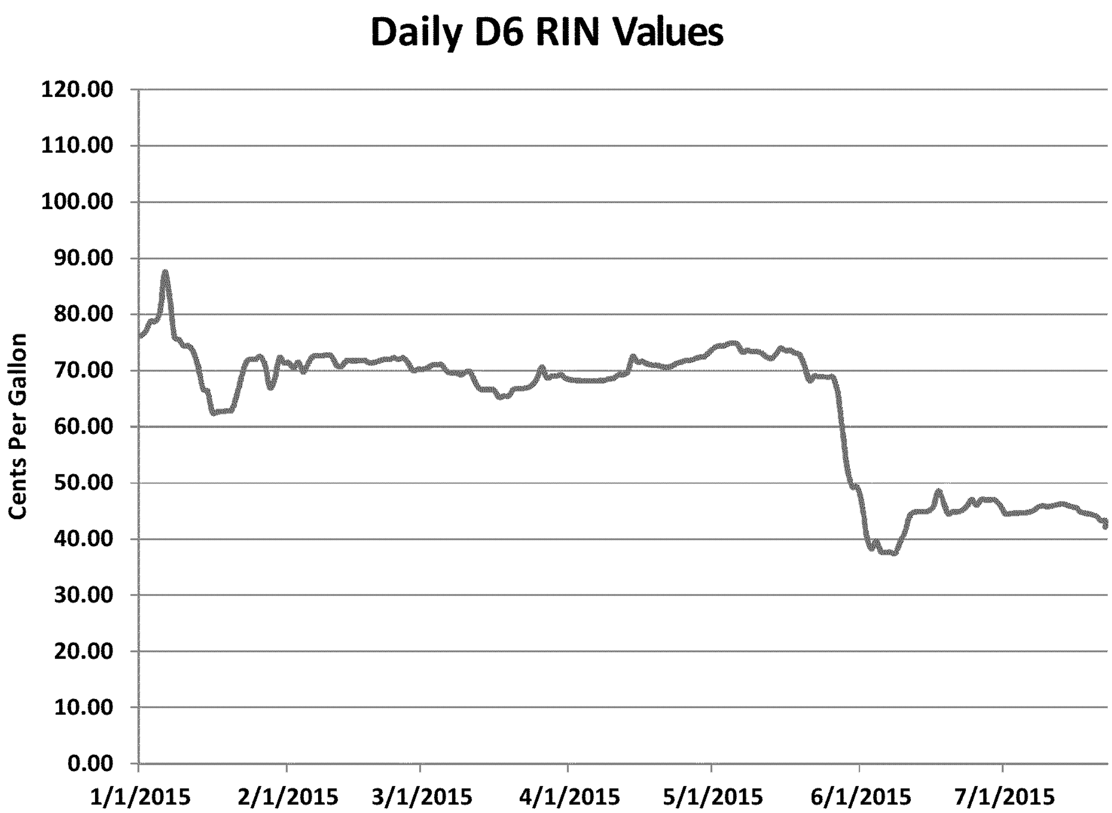
[76] 80 Fed. Reg. at 33,121 n.59.

[77] *Id.* at 33,130.

[78] *Id.* at 33,118.

occur in the absence of an RFS program and indeed higher volumes than are currently being supplied, RIN prices are likely to be higher than historical levels."[79]

The market begs to differ. Review of RIN prices before and after EPA's proposal was released on May 29, 2015, provides a stark reality check:



Source: Oil Price Information Service

This graph shows the daily price of D6 RINs (which corresponds to non-advanced renewable fuel) performing a "cliff div[e]"[80] as EPA announced its proposal. That "should make it obvious which way the RINs market voted with regard to the degree of push in the EPA proposal."[81] To put it bluntly, the smart money knows that the proposed renewable fuel volumes mean little or no push beyond current usage levels. Notably, even after accounting for EPA's

[79] *Id.* 33,129; *see also id.* 33,105-33,106, 33,109.

[80] Scott Irwin & Darrel Good, *The EPA's Proposed Ethanol Mandates for 2014, 2015, and 2016: Is There a 'Push' or Not?*, Farmdoc Daily No. (5):102, at 5 (June 3, 2015), *at* http://farmdocdaily.illinois.edu/pdf/fdd030615.pdf.

[81] Irwin & Good, *supra* note 80, at 5.

latest RFS proposal, EIA still projects that the pool-wide ethanol content will be just 9.94% in 2016, which is below the 10% level of the E10 blendwall.[82]

The reasons for this are clear. EPA's proposal would not drive growth in 2016, and it strongly suggests that EPA will continue to stifle growth in 2017 and thereafter.

A. EPA's Proposed Volume Requirements Would Not Drive Growth In Renewable Fuel Through 2016

The bank of carryover RINs, which EPA has intentionally declined to account for when proposing the volume requirements, could and likely would be used to achieve compliance through 2016 with minimal growth, if any. With the 2014 renewable fuel volume proposed to be set to the level of actual net RIN generation (15.93 bil), and thus requiring no banked RINs for compliance, EPA's proposal and calculations imply that, if the industry maintained its 2014 level through 2016, an additional net 1.84 bil RINs would be needed to comply with the proposed 2015 and 2016 volume requirements.[83] That amount of additional RINs, however, is virtually identical to the size of the bank of carryover RINs that EPA expects "after obligated parties fulfil their compliance obligations for 2013," namely, "approximately 1.8 billion RINs."[84] Therefore, obligated parties could use the RIN bank to achieve full compliance with EPA's proposal through 2016 while barely expanding the use of renewable fuels above 2014 levels.

And that is not even accounting for EPA's understatement of 2014 net D6 RIN generation based on its erroneous treatment of some exported ethanol. As discussed below, 2014 net D6 RIN generation was at least 370 mil higher than the proposal assumed.[85] As it turns out, the corrected net *2014* RIN generation is the same as the proposed *2015* renewable fuel volume requirement: 16.3 bil.[86] In other words, if the industry simply maintained its 2014 level of renewable fuel use in 2015, it would comply with the proposed requirement for both years, and have 370 mil RINs to spare. After that excess is added to the RIN bank, the industry could then maintain its (corrected) 2014 level through 2016, fully comply with the proposed renewable fuel volume requirements for 2014, 2015, and 2016, and still have more than one billion RINs in the bank, which it could use in 2017 and thereafter to continue to avoid having to make investments to grow renewable fuels. Table 2 summarizes this analysis.

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[82] *See* EIA, *Short-Term Energy Outlook*, Table 4a (July 2015) (Motor Gasoline and Fuel Ethanol blended into Motor Gasoline).

[83] 0.370 = 16.3 [2015 proposed volume] – 15.93 [2014 actual volume]. 1.47 = 17.4 [2016 proposed volume] – 15.93 [2014 actual volume]. 0.370 + 1.47 = 1.84.

[84] 80 Fed. Reg. at 33,130.

[85] *See infra* Part VIII.

[86] 16.3 = 15.93 + 0.37.

Table 2: Compliance with Proposed Volume Requirements After 2014 Export Correction			
	2014	**2015**	**2016**
2014 net RIN generation assumed by EPA	15.93	N/A	N/A
Correction for 2014 exported ethanol	.37	N/A	N/A
Corrected 2014 net RIN generation (sustained through 2016)	16.30	16.30	16.30
EPA proposed renewable fuel requirement	15.93	16.30	17.40
RIN drawdown	-0.37	0.00	1.10
Carryover RIN bank balance*	2.17	2.17	1.07

All numbers in billions of RINs

** Initial carryover RIN bank balance is 1.8 bil*

EPA's proposal, therefore, would utterly fail to further Congress's goal of using the RFS program to stimulate rapid expansion in the production and use of renewable fuels, and instead would simply maintain the status quo. As discussed below, EPA should at a minimum treat carryover RINs as "supply" for purposes of the general waiver provision so that this could not happen.[87]

B. EPA's Proposed Volume Requirements Would Enable EPA To Continue To Stifle Growth In 2017 And Beyond

EPA's proposal would fail to drive growth in renewable fuels not only through 2016, but also likely in 2017 and beyond. As just noted, obligated parties would have more than one billion RINs in the bank after fully complying with EPA's proposal through 2016 without even increasing their levels above 2014 levels. But it gets worse. EPA's proposed renewable fuel volume requirements appear to have been calibrated to enable EPA to trigger its "reset" authority so that EPA could continue to stifle growth in the long term, rather than to pursue the goals of the statute, which would render its proposal unlawful.[88]

Section 7545(*o*)(7)(F) creates what is commonly referred to as the "reset" (or "off ramp") authority because, once triggered, it enables EPA to discard the statutorily prescribed volume requirements and set new volumes without having to invoke the general waiver authority—a freedom EPA would not otherwise have until 2023, after the statutory levels had expired. EPA's current proposal would trigger EPA's "reset" authority for advanced biofuel and cellulosic biofuel by a wide margin. EPA proposed to waive the advanced biofuel volume down by 47% in 2015 and 53% in 2016; and to waive the cellulosic biofuel volume down by more than 95% for both 2015 and 2016.[89] EPA then conspicuously also proposed to set the renewable fuel volume

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[87] *See infra* Part IX.

[88] *See Michigan v. EPA*, No. 14-46, slip op. at 5 (U.S. June 29, 2015) ("[A]gency action is lawful only if it rests 'on a consideration of the relevant factors." (quoting *Motor Vehicle Mfrs. Ass'n of United States, Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983)).

[89] *See* 80 Fed. Reg. at 33,103.

requirements at nearly precisely the levels necessary to trigger its reset authority for 2017. EPA's proposed renewable fuel volume requirement is 20.49% lower than the statutory level in 2015 (16.3 bil gal, rather than 20.5 bil gal) and 21.80% lower in 2016 (17.4 bil gal, rather than 22.25 bil gal).[90] As a result, EPA would be released from the congressionally prescribed volume requirements not only for cellulosic biofuels and advanced biofuels, but also for renewable fuels, six years ahead of Congress's schedule. (EPA was already released with respect to BBD.) EPA would then have substantial autonomy to set new volume requirements as it sees fit, without having to justify invocation of the general waiver authority, and subject only to the six pliable factors laid out in Section 7545(*o*)(2)(B)(ii). In addition, EPA would potentially be able to avoid having to annually go through the process of setting volume requirements, an obligation that has clearly presented significant challenges for the agency.

Although EPA never mentions the reset power in its proposal, the fact that the proposal would trigger the reset power appears to have been deliberate. Just a few weeks after the proposal was issued, EPA Acting Administrator for Air and Radiation Janet McCabe testified to Congress that "we actually think it makes a lot of sense to focus a reset on all volumes at one time."[91] Accordingly, she said, "the minute 2016 is done, we will be turning our full attention to the 2017 rule and the reset."[92] Indeed, Ms. McCabe added, EPA staff are "already thinking about the kinds of things they needed to be thinking about for the reset."[93] (Ms. McCabe also emphasized that the reset process would be time-consuming—"likely … longer than the one year required for the annual volumes"[94]—and thus cause yet more uncertainty for the renewable fuel industry.)

That EPA's proposal would trigger the reset power is especially troubling given that the substance of its proposal, in conjunction with the prior proposal for 2014, leaves little doubt that EPA will embrace its self-aggrandized autonomy to continue to treat the RFS program as a backward-facing accounting mechanism that largely preserves the status quo rather than as the mechanism for the driving rapid expansion in the production and use of renewable fuel that Congress intended and that would best serve the Nation. That outcome, which the market surely recognizes, will further undermine any growth in renewable fuel in the short term. If the market believes there is a substantial probability of a reset in 2017, then the presence of the RIN bank would make it especially unlikely that actual biofuel volumes would increase in 2015 and 2016, compared to 2014. Instead, operating under the assumption that carryover RINs will be worth little once the reset occurs because of the likely soft volume requirements, obligated parties would have a strong incentive to consume the RIN bank and maintain past volumes.

[90] *See id.*

[91] Testimony of Janet McCabe, *supra* note 5, at 21 (June 18, 2015) (emphasis added), *at* http://www.cq.com/doc/financialtranscripts-4711934?6&search=1E4v24rR.

[92] *Id.* at 23.

[93] *Id.*

[94] *Id.* at 22.

IV. BECAUSE THE AMOUNT OF RENEWABLE FUEL IS ADEQUATE FOR OBLIGATED PARTIES TO MEET THEIR STATUTORY OBLIGATIONS AFTER THE PROPOSED CELLULOSIC WAIVER FLOW-THROUGH, EPA MAY NOT USE ITS GENERAL WAIVER AUTHORITY TO FURTHER REDUCE THE RENEWABLE FUEL VOLUME REQUIREMENTS

EPA may invoke its general waiver authority only if there is "inadequate domestic supply."[95] EPA interprets the phrase "inadequate domestic supply" to "encompass the full range of constraints that could result in an inadequate supply of renewable fuel *to the ultimate consumers*."[96] EPA explains that this would include not only "factors affecting the ability to produce or import qualifying renewable fuels," but also "factors affecting the ability to distribute, blend, dispense, and consume those fuels in vehicles."[97]

EPA's interpretation of the general waiver authority is impermissible. The statute's text, structure, purpose, and legislative history all clearly show that Congress intended "supply" to refer to the amount of renewable fuel for obligated parties to comply with the applicable statutory volume requirements, not the amount that can ultimately make it into drivers' gas tanks as an ingredient in blended transportation fuel.

Besides this strong statutory evidence, discussed presently, the ordinary usage of the word "supply" shows that it cannot be interpreted to include constraints on the ability to distribute renewable fuel as an ingredient in another product (transportation fuel) that is delivered to the ultimate consumer or on the ability to consume it. It would be like saying that in order to measure of supply of sugar, one must take into account whether Nabisco has decided to cut production of Oreos and Chips Ahoy! cookies, or whether New York City has enacted an ordinance limiting the amount of shelf space that grocery stores could devote to cookies. True, Nabisco's decision to cut production of cookies or New York City's ordinance limiting shelf space for cookies might reduce the supply of *cookies* available for retailers (and in turn consumers). Likewise, retailers' lack of suitable underground storage tanks might limit the supply of a particular *transportation fuel to consumers*. But those constraints in the middle of the value chain would actually function only as limitations on *demand* for the upstream good, i.e., the sugar, or the renewable fuel.

In fact, the primary supposed constraints of interest to EPA cannot be understood as supply to *anyone*—they can only be understood as demand. For example, as EPA even acknowledges, "[t]he amount of ethanol associated with the E10 blendwall is driven by the total *demand* for gasoline."[98] What limits consumption of ethanol as E10 is that the driving public

[95] 42 U.S.C. § 7545(*o*)(7)(A).

[96] 80 Fed. Reg. at 33,111.

[97] *Id.* at 33,111; *see also, e.g.*, *id.* at 33,106 ("the infrastructure available for distributing, blending, and dispensing renewable fuels"); *id.* ("the ability of available renewable fuels to be used as transportation fuel, heating oil, or jet fuel"); *id.* at 33,112 ("the capacity to distribute the product to the ultimate consumer.").

[98] *Id.* at 33,126 (emphasis added).

does not want to consume any more, whether because they have nowhere else to drive or because they find gasoline prices too high.[99] Similarly, that some consumers lack a vehicle that is compatible with a particular type of transportation fuel (e.g., an FFV for E85), or might *believe* they lack such a vehicle (e.g., if their car was made after 2000 but its warranty does not explicitly approve the use of E10), is a matter of demand because even if abundant volumes of the transportation fuel were available to them, such consumers would still decline to use it. To say otherwise, as EPA does, would be like saying that there is limited "supply" of DVDs because of a shortage of DVD players.

In other words, EPA is trying to expand "supply" of "renewable fuel" to include "demand," all the way down the value chain to the ultimate consumer. Those concepts are, of course, antitheses. Words are not infinitely malleable, and EPA is not free to treat them interchangeably or to give them their opposite meaning when interpreting a statute. Even if the term "supply" in the general waiver provision were ambiguous in the abstract, EPA's proposed interpretation would still be foreclosed because it "goes beyond the limits of what is ambiguous and contradicts what … is quite clear"—that "supply" cannot mean "demand."[100] It is particularly unreasonable to consider constraints on demand for renewable fuel when, as described below, the very mechanism Congress chose to spur growth in renewable fuels was to *mandate demand* for renewable fuels through increasing volumetric requirements.

Properly understood, the general waiver authority cannot be exercised with respect to the renewable fuel requirements for 2014-2016. In each of those years, there was, or will be, sufficient supply to meet the statutory volumes after the proposed flow-through of the cellulosic waiver. EPA seems to understand this, remarking that "at least for 2014 and possibly 2015 and 2016, there is no shortage of ethanol and other types of renewable fuel that could be used to satisfy the statutory applicable volume of total renewable fuel."[101]

A. The General Waiver Provision Accounts Only For The Amount Of Renewable Fuel Available To Obligated Parties, Not The Amount Of Transportation Fuel Available To Consumers

1. The statute's text and structure show that "supply" means the supply of renewable fuel available to obligated parties

EPA asserts that the general waiver provision is "ambiguous" because "it does not specify what the general term 'supply' refers to."[102] In particular, EPA says, the waiver

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[99] *See id.*

[100] *Whitman v. American Trucking Ass'ns*, 531 U.S. 457, 481 (2001); *see also City of Arlington, Texas v. FCC*, 133 S. Ct. 1863, 1874 (2013) ("Where Congress has established a clear line, the agency cannot go beyond it; and where Congress has established an ambiguous line, the agency can go no further than the ambiguity will fairly allow.").

[101] 80 Fed. Reg. at 33,113.

[102] *Id.* at 33,111.

provision "does not specify what product is at issue … or the person or place at issue … in determining whether there is an 'inadequate domestic supply.'"[103]

It is true that the provision ends with the phrase "an inadequate domestic supply," full stop. But Congress' economical prose hardly makes the provision "ambiguous." "In determining whether Congress has specifically addressed the question at issue," EPA (like the courts) "should not confine itself to examining a particular statutory provision in isolation."[104] Rather, "[s]tatutory construction … is a holistic endeavor."[105] Because "[t]he meaning—or ambiguity—of certain words or phrases may only become evident when placed in context," "[i]t is a fundamental canon of statutory construction that the words of a statute must be read in their context and with a view to their place in the overall statutory scheme."[106] Indeed, a "provision that may seem ambiguous in isolation is often clarified by the remainder of the statutory scheme—because the same terminology is used elsewhere in a context that makes its meaning clear or because only one of the permissible meanings produces a substantive effect that is compatible with the rest of the law."[107] That is the case here.

The text of the statute as a whole makes unmistakably clear that Congress intended "supply" to refer to renewable fuel, and nothing more. EPA previously agreed with this position, declaring that "it is ultimately *the availability of qualifying renewable fuel* … that will determine the extent to which EPA should issue a waiver of RFS requirements on the basis of inadequate domestic supply."[108] There is no sound basis for reading the general waiver provision differently today.

In providing for waiver authority, section 7545(*o)*(7)(A) mentions one and only one product: "renewable fuel." It is therefore plain that the product to which "supply" refers is renewable fuel. Reading "supply" to refer to the transportation fuel dispensed to consumers is as unreasonable and inconsistent with the plain language as reading it to refer to toasters: neither is mentioned anywhere in the general waiver provision.

At times, EPA seems to agree that "supply" refers to the supply of renewable fuel; the real locus of EPA's perceived ambiguity appears to be in the term "renewable fuel."[109] EPA points out that "various parties interact across several industries to make renewable fuel available for use by the ultimate consumers as transportation fuel."[110] In EPA's view, the general waiver

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[103] *Id.*

[104] *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 132 (2000).

[105] *United Sav. Ass'n of Tex. v. Timbers of Inwood Forest Assocs.*, 484 U.S. 365, 371 (1988).

[106] *Brown & Williamson*, 529 U.S. at 133.

[107] *United Sav. Ass'n*, 484 U.S. at 371.

[108] EPA, *Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program*, 75 Fed. Reg. 14,670, 14,698 (Mar. 26, 2010) (hereinafter 2010 RFS2 Impact Analysis) (emphasis added).

[109] *See* 80 Fed. Reg. at 33,111.

[110] *Id.*

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provision is ambiguous because it "does not specify" whether it refers to "neat renewable fuel or renewable fuel that is blended with transportation fuel."[111] EPA thus proposes to interpret the general waiver provision to account for the entire renewable-fuel value chain: "factors affecting the ability to produce or import qualifying renewable fuels as well as factors affecting the ability to distribute, blend, dispense, and consume those fuels in vehicles."[112]

EPA is wrong that "renewable fuels" is ambiguous. First, the statute defines "renewable fuel" to mean "fuel that is produced from renewable biomass and that is used to replace or reduce the quantity of fossil fuel present in a transportation fuel."[113] And it defines "transportation fuel" to mean "fuel for use in motor vehicles, motor vehicle engines, nonroad vehicles, or nonroad engines (except for ocean-going vessels)."[114] In other words, according to Congress, renewable fuel is something supplied to refiners and others to be inserted into transportation fuel, and transportation fuel is something supplied to and consumed by consumers; renewable fuel is not supplied to consumers.

Congress's use of these terms elsewhere in the statute confirms this understanding.[115] The heart of the RFS program is the statute's specification of "the applicable volume of renewable fuel" over many years, and the corresponding "renewable fuel obligation" imposed on "refineries, blenders, and importers, as appropriate."[116] EPA has rightly never suggested in the context of implementing these provisions that these parties could satisfy their obligations by refining fuel containing a certain level of *transportation* fuel—something that does not even make sense.

Perhaps EPA would stress that it is proposing to interpret "renewable fuel" not to mean "transportation fuel" but rather "the renewable fuel that has been blended into transportation fuel."[117] This subtle difference would only amplify the absurdity of its proposed interpretation. It would mean, for example, that the statute required EPA to promulgate regulations to "ensure that transportation fuel sold or introduced into commerce in the United States … contains at least the applicable volume of renewable fuel [blended into transportation fuel]."[118] It would also mean that the statute required EPA to provide for "the generation of an appropriate amount of

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[111] *Id.*

[112] *Id.*; *see also, e.g.*, *id.* at 33,106 ("the infrastructure available for distributing, blending, and dispensing renewable fuels"); *id.* ("the ability of available renewable fuels to be used as transportation fuel, heating oil, or jet fuel"); *id.* at 33,112 ("the capacity to distribute the product to the ultimate consumer.").

[113] 42 U.S.C. § 7545(*o*)(1)(J).

[114] *Id.* § 7545(*o*)(1)(J).

[115] *See Envtl. Def. v. Duke Energy Corp.*, 549 U.S. 561, 574 (2007) ("[W]e presume that the same term has the same meaning when it occurs here and there in a single statute").

[116] 42 U.S.C. § 7545(*o*)(2)(A)(iii)(I), (3)(B)(ii)(I).

[117] 80 Fed. Reg. at 33,111.

[118] 42 U.S.C. § 7545(*o*)(2)(A)(i).

credits by any person that refines, blends, or imports gasoline that contains a quantity of renewable fuel [blended into transportation fuel] that is greater than the quantity required under paragraph (2)."[119] How can transportation fuel contain something known as renewable fuel blended into transportation fuel? How can someone blend into gasoline a quantity of something called renewable fuel blended into transportation fuel? Such sentences do not even compute. Clearly that is not what Congress intended.

Notably, it is solely in the context of the general waiver provision that EPA tries to stretch "renewable fuel" to encompass the downstream products that might contain it. EPA offers no explanation for treating one instance of a term used throughout the statute differently from all the other instances. That alone renders its proposed interpretation of the general waiver authority arbitrary and capricious.

EPA also maintains that there is ambiguity insofar as the general waiver provision "does not specify … the person or place at issue (for example, obligated party, blender or ultimate consumer)."[120] Thus, again EPA finds license to consider the entire value chain, down "to the ultimate consumer."[121] EPA attempts to justify this interpretation by averring that "the concept of 'supply' does not occur in isolation, but in reference to the person intending to make use of the product."[122] Regardless of whether EPA can introduce a relational "concept of 'supply'" into the statute, that concept does not provide additional support for EPA's interpretation of the general waiver provision; at best, it begs the question. As just explained, the product whose supply is to be measured for purposes of the general waiver provision is renewable fuel—or neat renewable fuel, as EPA wants to term it just for purposes of the general waiver. That product is supplied only to obligated parties. Therefore, even if "supply" must account for constraints on distribution to the person who will use the product, it still only reaches the distribution of renewable fuel to obligated parties and no further down the value chain.

This analysis is confirmed by the general waiver provision's references to paragraph (2), which direct the Administrator to revise regulations "to ensure that transportation fuel sold or introduced into commerce in the United States" contains the specified volumes of renewable fuels.[123] Paragraph (2) also provides that these regulations are to apply to the obligated parties.[124] The statutory scheme here is clear: obligated parties fulfill their obligations by blending specified amounts of renewable fuel into transportation fuel, not by selling the blended transportation fuel or by enabling consumers to use the blended transportation. The point of the general waiver authority, then, is to relieve obligated parties of that blending obligation if they cannot obtain enough of the renewable fuel they need to comply with it. EPA reveals its basic misunderstanding of the RFS program and the general waiver provision when it remarks to the

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[119] *Id.* § 7545(*o*)(5)(A)(i).

[120] 80 Fed. Reg. at 33,111.

[121] *Id.*

[122] *Id.* at 33,112.

[123] 42 U.S.C. § 7545(*o*)(2)(A)(i).

[124] *Id.* § 7545(*o*)(2)(A)(iii)(I).

contrary, for example, that the proposed general waiver rests on its concern that "marketplace and infrastructure constraints … prevent the fuel market from *supplying vehicles the volumes of ethanol needed to meet the statutory level* of total renewable fuel."[125] Paragraph (2) makes clear that neither vehicles nor their drivers are subject to any obligations under the statute, and compliance with volume obligations is not determined by whether blended transportation fuel reaches or is consumed by ultimate consumers.

In contrast, where Congress intended for EPA to consider the capacity to distribute a type of fuel further down the chain, it said so explicitly. Time and again, Congress used the term "distribution capacity" or a similar term—often in juxtaposition with "supply"—making clear that they have distinct meanings and that by omitting "distribution capacity" from the general waiver provision, Congress intended to exclude it from consideration rather than adopt an anomalous definition of "supply" to include it:

- Section 7545(m)(3)(C) allows EPA to delay the effective date of certain oxygenated gasoline requirements if EPA finds "an inadequate domestic supply of, or distribution capacity for, oxygenated gasoline" or fuel additives needed to make it.[126] It then mandates that "[i]n granting waivers under this subparagraph the Administrator shall consider distribution capacity separately from the adequacy of domestic supply."[127]

- Section 7545(*o*)(2)(B)(ii)(IV) authorizes the Administrator to consider "the sufficiency of infrastructure to deliver and use renewable fuel" in setting applicable volumes after 2022.[128] There would have been no reason for Congress to direct EPA to consider distribution infrastructure *after* 2022 if the general waiver provision already directed EPA to consider distribution infrastructure *anytime*.

- Section 7545(*o*)(8) allowed a waiver in 2006, the first year of the RFS program, based on an evaluation of renewable fuel "(i) supplies and prices; (ii) blendstock supplies; and (iii) supply and distribution system capabilities."[129] This provision explicitly treats supply and distribution capacity as distinct.

- Section 7545(c)(4)(C)(v)(IV) permits EPA to approve certain controls or prohibitions applicable to new fuels if EPA finds that the new control "will not cause fuel supply or distribution interruptions."[130] Again, this provision explicitly treats supply and distribution constraints as distinct.

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[125] 80 Fed. Reg. at 33,113 (emphasis added).

[126] 42 U.S.C. § 7545(m)(3)(C)(i).

[127] *Id.* § 7545(m)(3)(C)(iii).

[128] *Id.* § 7545(*o*)(2)(B)(ii)(IV).

[129] *Id.* § 7545(*o*)(8)(B) (emphasis added).

[130] *Id.* § 7545(c)(4)(C)(v)(IV).

EPA's attempt to import distribution capacity into the general waiver provision therefore defies the traditional canon of statutory construction that "Congress generally acts intentionally when it uses particular language in one section of a statute but omits it in another."[131]

EPA points to section 7545(k)(6), but that is not to the contrary. EPA ignores the fact that the provision immediately preceding it, paragraph (5), prohibits the "sale or dispensing by any person of conventional gasoline to ultimate consumers," and the "sale or dispensing by any refiner, blender, importer, or marketer of conventional gasoline for resale" after a certain date.[132] In short, it prohibits all wholesale and retail sales—at any point along the distribution chain—of conventional gasoline. The purpose of these prohibitions is to encourage the regulated entities to sell "reformulated gasoline" ("RFG"), which must be certified.[133] Paragraph (6) allows the Administrator to delay the application of paragraph (5)'s prohibitions under certain circumstances. EPA observes that paragraph (6)(A)(ii) allows the Administrator to delay application of the prohibitions upon a finding that "there is insufficient domestic *capacity to produce*" certified RFG, whereas paragraph (6)(B)(i)(I) and (iii) allows the Administrator to delay application of the prohibitions upon a finding that there "there is insufficient *capacity to supply* [RFG]."[134] EPA "believe[s] Congress likely intended the 'capacity to supply' RFG as being broader in scope than the 'capacity to produce' RFG"—"capacity to produce" is merely how much RFG can be manufactured, whereas "the term 'capacity to supply' would … be expected to include consideration of the infrastructure needed to deliver RFG to vehicles."[135]

Even if EPA's interpretation of section 7545(k)(6) is correct, it does not hold the lesson for the general waiver provision that EPA believes. Section 7545(k)(6), in conjunction with paragraph (5)'s prohibitions, explicitly focuses on the entire distribution chain for conventional gasoline, from the refiner on down to the retailer. Accordingly, it may be reasonable to interpret "capacity to supply" to encompass infrastructure needed to deliver RFG to consumers and intermediate parties up the chain. In contrast, as discussed above, the general waiver provision, in conjunction with the prohibitions and penalties imposed by the volume requirements, explicitly focuses solely on an upstream input—renewable fuel—and the upstream parties who acquire it—the refiners and other obligated parties. Because there are no distribution or infrastructure barriers that prevent biofuel producers from delivering their product to obligated parties, production equals supply for purposes of the general waiver.

EPA also points to section 7545(c)(4)(C)(ii), but that provision does not support EPA's interpretation of the general waiver authority either. Section 7545(c)(4)(C)(ii) allows the Administrator to temporarily waive certain prohibitions upon a finding that "extreme and

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[131] *Department of Homeland Sec. v. MacLean*, 135 S. Ct. 913, 919 (2015) (quoting *Russello v. United States*, 464 U.S. 16, 23 (1983)) (where statute used the phrase "not specifically prohibited by law" in one place and the phrase "law, *rule, or regulation*" elsewhere, the Supreme Court held that "law" "standing alone" was "meant to exclude rules and regulations").

[132] 42 U.S.C. § 7545(k)(5).

[133] *See, e.g.*, *id.* § 7545(k)(1)(A), (2) & (4).

[134] *Id.* § 7545(k)(6)(A)(ii), (B)(i)(I) & (iii) (emphasis added).

[135] 80 Fed. Reg. at 33,112.

unusual fuel or fuel additive supply circumstances exist in a State or region of the Nation which prevent the distribution of an adequate supply of the fuel or fuel additive to consumers."[136] Here again, Congress has explicitly used the word "distribution" when it meant to account for distribution constraints, unlike in the general waiver provision. In any event, even if section 7545(c)(4)(C)(ii) shows that Congress uses "supply" to include the infrastructure needed to deliver that supply, what would make it reasonable to interpret "supply" in section 7545(c)(4)(C)(ii) to include infrastructure constraints all the way down to consumers is that section 7545(c)(4)(C)(ii) *explicitly says so*: "prevent the distribution of an adequate supply of the fuel or fuel additive *to consumers*." Again, the general waiver provision does not contain such language.[137]

2. EPA's proposed interpretation contravenes the purpose of the RFS program

EPA asserts that "allowing RFS waivers only where there is insufficient 'capacity to produce' renewable fuel would be extremely problematic" because ethanol production capacity exceeds the amount of ethanol currently being consumed and expanding consumption through E15 or E85 would face challenges.[138] EPA believes that "[i]mposing RFS volume requirements on obligated parties without consideration for the ability of the obligated parties and other parties to deliver the renewable fuel to the ultimate consumers would [not] achieve [the RFS programs' desired] benefits and would fail to account for the complexities of the fuel system that delivers transportation fuel to consumers."[139]

EPA's reasoning amounts to a repudiation rather than an interpretation of the statute. A statute must not be "interpret[ed] … to negate [its] own stated purpose[],"[140] but that is precisely what EPA's proposal would do by interpreting the general waiver provision to permit consideration of constraints on the distribution and consumption of transportation fuel (containing renewable fuel) downstream from the obligated parties.[141]

Congress designed the RFS program to stimulate the innovation needed to "increase the production of clean renewable fuels."[142] Congress sought to do this by dictating annual increases in obligated parties' use of various types of renewable fuels, including conventional ethanol-

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[136] 42 U.S.C. § 7545(c)(4)(C)(ii)(I).

[137] EPA also says that the waiver provision is ambiguous because it "does not specify what factors are relevant in determining the adequacy of the supply." 80 Fed. Reg. at 33,111. Of course it does: the availability of renewable fuel to obligated parties, for all the reasons just stated.

[138] *Id.* at 33,112 n.25.

[139] *Id.*

[140] *New York State Dep't of Social Servs. v. Dublino*, 413 U. S. 405, 419-420 (1973).

[141] *See* Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594; Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492.

[142] 121 Stat. at 1492.

based fuel, in the preparation of transportation fuel—that is, by mandating increasing demand for renewable fuels. Congress did not design the RFS to wilt in the face of obligated parties' inadequate investment in infrastructure to facilitate the distribution and consumption of more renewable fuel. To the contrary: as EPA knows, Congress was well aware of the E10 blendwall and the associated limitations on the distribution and consumption of blended gasoline when it established the current RFS program in 2007.[143] Fully cognizant of that challenge, Congress deliberately chose to mandate volumes that would require widespread deployment of transportation fuels containing more than 10% ethanol. The self-evident purpose for mandating those volumes was to vault the level of renewable-fuel consumption over obstacles like the E10 blendwall. If Congress were content to stop at the blendwall, it could simply have mandated nationwide E10.

In order to surmount obstacles like the blendwall, the RFS program requires obligated parties to blend a certain amount of renewable fuel and then creates a market mechanism to incentivize obligated parties to find an outlet for the resulting blended transportation fuel. This market mechanism—RINs[144]—is, as the Department of Agriculture has observed, "intended to provide economic incentives to facilitate additional ethanol production and use when the RFS exceeds the market equilibrium"—that is, when the statutory volume requirements exceed the amount that would be blended, distributed, and consumed otherwise.[145] The RIN mechanism would work—if EPA would let it—because, as detailed below, the primary barriers to consuming higher-blend transportation fuel are fundamentally economic.

Higher RIN prices, driven by mandated volumes above the blendwall, would put the necessary pressure on obligated parties to find ways to distribute transportation fuel and to encourage consumers to buy it, lest they be stuck with large inventories. As the D.C. Circuit remarked, "high RIN prices should, in theory, incentivize precisely the sorts of technology and infrastructure investments and fuel supply diversification that the RFS program was intended to

[143] 80 Fed. Reg. at 33,118 ("At the time EISA was passed in 2007, EIA's Annual Energy Outlook for 2007 projected that 17.3 billion gallons of ethanol is the maximum that could be consumed in 2022 if all gasoline contained E10 and there was no E0, E15, or E85. However, 17.3 billion gallons is far less than the 35 billion gallons of renewable fuel other than BBD that Congress targeted for use in 2022. Thus, if the statutory targets were to be achieved, 17.7 billion gallons of renewable fuel would need to be consumed in 2022 either as higher level ethanol blends (E11-E85), or as non-ethanol fuels.").

[144] *See* 42 U.S.C. § 7545(*o*)(5).

[145] Paul C. Westcott & Lihong L. McPhail, *High RIN Prices Signal Constraints to U.S. Ethanol Expansion*, USDA Econ. Res. Serv., Situation and Outlook No. FDS-13d-SA, at 5 (Apr. 12, 2013), *at* http://www.ers.usda.gov/media/1158986/fds-13d-sa.pdf.

promote."[146] But "large incentives to invest in the infrastructure that can reduce compliance costs can be created *only* if EPA sets mandates at levels that will result in high RIN prices if no investments are made."[147] Those incentives in turn would create pressure for the obligated parties to figure out ways to distribute and sell the necessary inventory of transportation fuel containing higher levels of ethanol or other forms of renewable fuels, including by lowering prices for such fuels relative to E10 in order to encourage consumers to buy more of it. Put simply, higher volume requirements give obligated parties an economic incentive to figure out how to distribute and sell their product. The RFS program thus functions by *creating* demand for renewable fuels, not by reacting to it. Waivers based on inadequate demand for renewable fuels (or transportation fuel downstream) would undermine the entire structure of the RFS program—especially when, as detailed below, sufficient infrastructure to distribute (and consume) levels of transportation fuel commensurate with the statutory volume requirements for renewable fuel could be achieved within 2016 and with modest investment.

By contrast, setting volume requirements based on existing levels of, or capacity for, distribution and consumption of blended transportation fuel, as EPA proposes to do, would perversely reward obligated parties for *refusing* to invest in renewable-fuel distribution infrastructure and for maintaining relatively high retail prices. After all, as EPA said just a few years ago, "[s]takeholders in the refining sector have been aware of the E10 blend wall since passage of EISA in December of 2007."[148] Had stakeholders begun investing in renewable-fuel distribution infrastructure in 2007, when the statutory volumes were enacted, in anticipation of

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146 *See Monroe Energy*, 750 F.3d at 919; *see also* Bruce Babcock, *RFS Compliance Costs and Incentives to Invest in Ethanol Infrastructure*, Iowa State University CARD Policy Brief 13-PB 13, at 12 (Sept. 2013) ("When the mandate is set at a level that is not easily met with existing infrastructure, then the incentive to invest in infrastructure is large."), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/13pb13.pdf; Bruce Babcock & Sebastien Pouliot, *The Economic Role of RIN Prices*, Iowa State University CARD Policy Brief 13-PB 14, at 3 (Nov. 2013) (hereinafter Babcock, *Economic Role of RIN Prices*) ("Because high RIN prices imply high compliance costs," higher mandates "create a large incentive to lower compliance costs."), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/13pb14.pdf; Jonathan Coppess, *EPA Doubles Down on Questionable Reading of the RFS Statute*, Farmdoc Daily No. (5):108, at 2 (June 11, 2015) ("The RFS is a technology-forcing mandate…."), http://farmdocdaily.illinois.edu/pdf/fdd110615.pdf.

147 Babcock, *RFS Compliance Costs and Incentives to Invest in Ethanol Infrastructure*, *supra* note 146, at 14 (emphasis added); *see also* Bruce Babcock & Sebastien Pouliot, *How Much E85 Can Be Consumed in the United States?*, Iowa State University CARD Policy Brief 13-PB 15, at 5 (Nov. 2013) ("Whether investment in E85 fueling infrastructure actually occurs depends on whether EPA sets biofuel mandates at levels that can be met only by increasing the amount of ethanol that is sold in E85."), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/13pb15.pdf; *see also* Babcock, *Economic Role of RIN Prices*, *supra* note 146 at 4 (high RIN prices drive obligated parties to reduce compliance costs by investing "in E85 and E15 infrastructures, which, in turn, would allow for the higher future biofuel consumption levels that are envisioned in current policy.").

148 EPA, *Notice of Decision Regarding Requests for a Waiver of the Renewable Fuel Standards*, 77 Fed. Reg. 70,752, 70,773 (Nov. 27, 2012) ("*Decision for RFS Waiver*").

the day when the statutory volume requirement would exceed the E10 blendwall, there would be no blendwall problem today. The challenges EPA cites as a basis for its waiver are almost entirely of obligated parties' own making, as they have spent years dragging their feet and refusing to invest in renewable-fuel distribution infrastructure precisely to try to entrench the E10 blendwall in hopes that EPA would waive the volume requirements.[149] Again, EPA recognized this not long ago: "The affected industries have had and continue to have the ability to achieve widespread adoption of E85 through working with partners in the retail and terminal infrastructure sectors to increase the number of stations that offer E85 or other intermediate ethanol blends and improve the pricing structure relative to E10."[150] All that has changed since then is that EPA now proposes to reward the oil industry's strategic recalcitrance, thwarting Congress's plan and depriving the Nation of the numerous substantial benefits that the RFS program could provide, including environmental benefits that EPA has already assumed, as discussed below. EPA suddenly treats this as a regrettable happenstance,[151] but as EPA well knows, it is no accident. EPA's market signals through this and its prior RFS proposal, along with obligated parties' refusal to prepare for the E10 blendwall, have brought us to this point.

Congress designed the RFS program to motivate obligated parties to invest in biofuel infrastructure, not to protect the status quo. EPA therefore should not—indeed, cannot—interpret "supply" in the general waiver provision to encompass constraints on the distribution and consumption of blended transportation fuel.

3. The legislative history makes clear that "supply" means the amount of renewable fuel available to obligated parties

The legislative history confirms that the general waiver authority may be invoked only when the amount of renewable fuel is inadequate for obligated parties to meet their volume obligations. Congress in fact specifically removed distribution capacity from the trigger for the general waiver authority, foreclosing any interpretation that would restore it.

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[149] *See, e.g.*, *infra* pp.49-50; *infra* n.337; *see also* Renewable Fuels Association, *Protecting the Monopoly: How Big Oil Covertly Blocks the Sale of Renewable Fuels* (July 2014) ("*Protecting the Monopoly*"), *at* http://www.ethanolrfa.org/page/-/Protecting%20the%20Monopoly.pdf?nocdn=1; Bruce Babcock & Sebastien Pouliot, *Feasibility and Cost of Increasing US Ethanol Consumption Beyond E10*, CARD Policy Brief 14-PB 17, at 2, 13 (Jan. 2014) (estimating that by investing $65 million to equip 500 more stations to dispense E85, oil companies could have reduced the value of RINs needed for RFS compliance by more than $7 billion"), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/14pb17.pdf; Letter from Bob Dineen, President and CEO, Renewable Fuels Association, to Robert Perciasepe, Acting Administrator, U.S. Environmental Protection Agency (Mar. 19, 2013) (describing Conoco-Phillips retaliation against franchisee for offering E15), *at* http://ethanolrfa.org/page/-/PDFs/RFA%20Zarco%20Letter%203-19-13.pdf?nocdn=1.

[150] 77 Fed. Reg. 70,752, 70,773 (Nov. 27, 2012).

[151] *E.g.*, 80 Fed. Reg. at 33,114 ("it is nevertheless the case as of today that there are a limited number of fueling stations selling high-ethanol blends, and as a result, the number of stations operates as a constraint on how much ethanol can be delivered").

The version of the amendment that was passed in the House would have permitted waivers "based on a determination by the Administrator ... that there is an inadequate domestic supply *or distribution capacity* to meet the requirement."[152] But during Conference, the reference to "distribution capacity" was excised, and Congress passed the bill as amended and the President signed it without that phrase. EPA dismisses this history as "uninformative,"[153] but Supreme Court precedent instructs otherwise: "drafting history showing that Congress cut out [specific] language … from the final statute … precludes any hope of a sound interpretation of" of the statute that would in effect restore the "trimmed" language.[154] The history of the statute therefore shows that Congress specifically intended that "supply" in the general waiver provision not encompass distribution capacity. EPA is not free to countermand Congress by adding "distribution capacity" back in through other linguistic means.

Still, EPA argues that Congress's choice to exclude "distribution capacity" from the general waiver provision was intended to communicate that EPA would be permitted but not required to consider distribution capacity when assessing whether "supply" was adequate. That argument strains common sense, especially in the face of the various statutory provisions distinguishing between supply and distribution capacity noted above. Congress could have given EPA discretion to consider distribution capacity simply by using the word "or," as in: "inadequate domestic supply *or distribution capacity*." In fact, Congress did exactly that in section 7545(m)(3)(C), as discussed above. Or Congress could have written, "inadequate domestic supply and, if appropriate, distribution capacity." Indeed, the reasonable possibilities are innumerable, but the language Congress actually used in the general waiver provision is not among them.

B. There Is Adequate Supply Of Renewable Fuels To Meet The Statutory Requirements Reduced No Further Than The Proposed Cellulosic Waiver Flow-Through In 2014-16

There is more than enough supply of renewable fuels for obligated parties to meet the renewable fuels volume requirements in 2014, 2015, and 2016 without a general waiver. Below, we consider only the domestic production capacity for two categories of renewable fuel: ethanol and biomass-based diesel (both biodiesel and renewable diesel). Were we to consider other categories of renewable fuel, such as biogas, or to consider imports of renewable fuel, the supply of renewable fuel would be markedly higher.[155]

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[152] H.R. 6, 109th Cong. § 1501(a), at 710 (engrossed Apr. 21, 2005) (emphasis added).

[153] 80 Fed. Reg. at 33,113.

[154] *Doe v. Chao*, 540 U.S. 614, 622-623 (2004).

[155] For example, EPA projects 0.173 bil gal in non-ethanol cellulosic biofuels in 2016. 80 Fed. Reg. at 33,128, Table II.D.2-2 n.a. Stratas Advisors estimates, using conservative historical data after expiration of the biodiesel tax incentive, that an amount of biodiesel sufficient to support about 0.748 bil RINs could readily be imported, given appropriate RIN incentives. Stratas Advisors, *Non-Ethanol Potential for RFS Compliance*, at 9 (July 16, 2015) ("Stratas Report") (attached as Exhibit 2). Stratas Advisors further estimates that an amount of renewable diesel sufficient to support about 0.742 bil RINs could readily be imported. *Id.* at 9-10.

1. Ethanol supply

According to the Renewable Fuels Association, domestic ethanol production capacity was 14.8795 bil gal per year ("bgy") as of January 2014, 15.077 bgy as of January 2015, and 15.401 bgy as of July 1, 2015.[156] EIA reports that U.S. fuel ethanol plant production capacity was only 13.681 bgy as of January 1, 2014, and 14.575 bgy as of January 1, 2015.[157] But EIA's 2014 capacity figure (at a minimum) is patently too low because it was exceeded by *actual* production. EIA reports that the average weekly U.S. oxygenate plant production of fuel ethanol was 0.919 mil barrels per day as of January 3, 2014, which annualizes to 14.088 bgy, 0.949 mil barrels per day as of January 2, 2015, which annualizes to 14.548 bgy, peaked at 0.994 mil barrels per day as of June 19, 2015, which annualizes to 15.238 bgy, and was 0.984 mil barrels per day as of July 10, 2015, which annualizes to 15.085 bgy.[158] There is no reason to believe that ethanol production capacity would be lower in 2016 than it is today.

These figures are summarized in Table 4.

Table 4: U.S. Ethanol Production Capacity

Source	January 2014	January 2015	June 2015	July 2015
RFA U.S. ethanol production capacity	14.8795	15.077	N/A	15.401
EIA U.S. fuel ethanol plant production capacity	13.681	14.575	N/A	N/A
EIA annualized average weekly U.S. oxygenate plant production of fuel ethanol	14.088	14.548	15.238	15.085

All numbers in billions of gallons per year

2. Biomass-based diesel supply

EPA states that registered biodiesel production capacity is "about 2.8 billion gallons,"[159] which could generate 4.2 bil RINs.[160] Similarly, *Biodiesel Magazine* reports that biodiesel

[156] Renewable Fuels Association, *Historic U.S. Fuel Ethanol Production*, *at* http://www.ethanolrfa.org/pages/statistics; http://www.ethanolrfa.org/bio-refinery-locations.

[157] *See* U.S. EIA, *U.S. Fuel Ethanol Production Capacity Archives*, at http://www.eia.gov/petroleum/ethanolcapacity/archive/2014/index.cfm (2014 data); http://www.eia.gov/petroleum/ethanolcapacity/ (2015 data).

[158] *See* U.S. EIA, *Weekly U.S. Oxygenate Plant Production of Fuel Ethanol*, *at* http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPOOXE_YOP_NUS_MBBLD&f=W.

[159] 80 Fed. Reg. at 33,116. EPA notes that there may be up to 0.800 bil gal of additional biodiesel capacity at *unregistered* facilities. *Id.* Because our capacity analysis does not account for unregistered facilities, to the extent that those facilities could register in time to yield RINs in 2016, our analysis is conservative.

[160] "Each gallon of biodiesel generates 1.5 RINs due to its higher energy content per gallon than ethanol." *Id.* at 33,132 n.86.

production capacity is 2.796 bgy.[161] And a recent report by Stratas Advisors concluded that maximum biodiesel production capacity is sufficient to generate about 4.140 bil RINs.[162] These levels have been steady throughout 2014 and 2015, and there is no reason to believe they would decline in 2016.[163]

EPA provides no reason that production could not reach these levels. EPA previously and correctly recognized that it is "relatively straightforward for much of the current unused capacity to be brought on line, something we believe will occur once sufficient incentive is put in place, such as the combined … volume requirement in this rule."[164] EPA further recognized at that time that "wide swings in production can occur extremely rapidly" and "[b]iodiesel plants have the ability to restart rapidly as evidenced by the long history of facilities shutting down temporarily and then starting back up again when economic conditions improve."[165] The same is true today.[166]

EPA also alludes to a need to secure sufficient feedstocks, but the proposal does not indicate this would be a problem.[167] Just the opposite. The proposal states that "[t]he combined volumes of soybean oil, corn oil, and waste oils produced annually is *far more than would be needed* to produce 2.1 billion gallons of biodiesel."[168] The proposal explains that "[i]t is possible that the market could divert additional feedstocks from food and other domestic uses or exports to the production of biodiesel. For instance, in 2014 exports of soy oil were 250 million gallons and exports of rendered fats and greases were 440 million gallons."[169] Further, according to a report by Stratas Advisors, over 100 domestic and foreign biodiesel plants are "grandfathered" to allow production of RINs from a wider source of sustainable feedstocks.[170] And a recent

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[161] *See* Biodiesel Magazine, USA Plants, http://biodieselmagazine.com/plants/listplants/USA/ (last accessed July 25, 2015).

[162] Stratas Report at 15 (attached as Exhibit 2).

[163] 80 Fed. Reg. at 33,128 n.72.

[164] *See* EPA, "Renewable Fuel Standard Program (RFS2) Summary and Analysis of Comments," at 3-187 (Feb. 2010), *at* http://www.epa.gov/otaq/renewablefuels/420r10003.pdf.

[165] *Id.* at 3-189.

[166] For this reason, EPA correctly did not limit itself to EIA's calculation that as of March 2015, biodiesel operating capacity was 2.125 bgy. *See* http://www.eia.gov/biofuels/biodiesel/production/table4.pdf; *see also* Stratas Report at 6 (attached as Exhibit 2). There is every reason to believe the registered capacity is available.

[167] 80 Fed. Reg. at 33,116.

[168] *Id.* at 33,128 (emphasis added).

[169] *Id.*

[170] Stratas Report at 7 (attached as Exhibit 2).

analysis by LMC International Ltd. found that available qualifying feedstocks in 2015 are equivalent to *7.6 bil gal* of biodiesel.[171]

In addition, domestic production capacity of renewable diesel is capable of generating about 0.362 bil RINs per year, according to Stratas Advisors.[172] According to EPA, in 2014 renewable diesel generated 0.269 bil RINs.[173]

Therefore, there is sufficient BBD production capacity to generate between 4.409 bil RINs (4.14 bil from biodiesel and 0.269 bil from renewable diesel) and 4.562 bil RINs (4.2 bil from biodiesel and 0.362 bil from renewable diesel).

3. Renewable fuel supply is sufficient to meet statutory levels after the cellulosic waiver flow-through

Whether the top end or the bottom end of the production capacity ranges described above are considered, the combined production capacity of ethanol and BBD is plainly substantial and far higher than EPA's proposal expects. And EPA cannot use its general waiver authority to reduce volume requirements below the level of supply. But the fact that that combined capacity might not quite reach the statutory renewable fuel volumes does not mean EPA may invoke its general waiver authority to reduce them. In particular, given the supply of renewable fuel, EPA lacks authority to waive the renewable fuel volume requirements further than the cellulosic waiver flow-through would support alone.

As described above, EPA has exercised its cellulosic waiver authority based on the supply of cellulosic biofuels, and it has decided to partially flow that waiver through to the advanced biofuel and renewable fuels volume requirements. The statutory renewable fuel volume requirements, after being reduced by EPA's proposed cellulosic waiver flow-through, are 17.08 bil gal for 2014, 17.90 bil gal for 2015, and 18.40 bil gal for 2015.[174] If EPA maintained these cellulosic waiver flow-throughs, the combined production capacity of ethanol and BBD alone would be more than enough to meet the adjusted volume requirements.[175] In fact, even in the worst case, supply would suffice to support 1 bil RINs in excess of these requirements. Consequently, EPA lacks the power to invoke its general waiver authority to

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[171] Testimony of Andrea Kavaler, LMC International Ltd., EPA-HQ-OAR-2015-0111-0993 (June 25, 2015).

[172] Stratas Report at 15-16 (attached as Exhibit 2).

[173] 2014 RIN Supply, EPA-HQ-OAR-2015-0111-0004.

[174] As explained above, EPA proposed to reduce the cellulosic requirement by 1.717 bil gal in 2014, 2.894 bil gal in 2015, and 4.044 bil gal in 2015, but to flow that waiver through only by 1.070 bil gal in 2014, 2.600 bil gal in 2015, and 3.850 bil gal in 2016. *See* 80 Fed. Reg. at 33,122.

[175] We assume for purposes of this comment that EPA performed its projection calculations properly when calculating the cellulosic waiver. If we discover that EPA made errors in this assessment, we reserve the right to object to the cellulosic waiver at a later time.

reduce the renewable fuel volume requirements for 2014-2016 further than it proposes to do by flowing the cellulosic waiver through. Table 3 summarizes this analysis.

Table 3: Supply to Meet Renewable Fuel Volumes After Cellulosic Waiver Flow-Through					
	Ethanol	**BBD**	**Total**	**Statutory After Cellulosic Flow-Thru**	**Excess RINs**
2014					
Maximum	14.8795	4.562	19.4415	17.080	2.3615
Minimum	13.681	4.409	18.090	17.080	1.010
2015					
Maximum	15.077	4.562	19.639	17.900	1.739
Minimum	14.548	4.409	18.957	17.900	1.057
2016					
Maximum	15.238	4.562	19.800	18.400	1.400
Minimum	15.085	4.409	19.494	18.400	1.094

All numbers in billions of RINs

V. EVEN IF EPA'S INTERPRETATION OF THE GENERAL WAIVER PROVISION WERE VALID, EPA COULD NOT INVOKE THAT AUTHORITY TO REDUCE THE RENEWABLE FUEL VOLUME REQUIREMENTS FURTHER THAN THE PROPOSED CELLULOSIC WAIVER FLOW-THROUGH BECAUSE SUPPLY WOULD STILL BE ADEQUATE

As discussed above, EPA believes that "factors that limit supplying [renewable fuels] to vehicles that can consume them," not just "limitations in production or importation of qualifying renewable fuels, … constitute circumstances that warrant a waiver."[176] In EPA's view, such factors include the blendwall, the number and distribution of retail stations offering the fuel, and the number of vehicles qualified to consume the fuel, among others.[177] We explained above why EPA's interpretation of the general waiver provision is impermissible. In this Part, we *assume* that it is permissible, and then show that even still, "supply" so construed—again focusing only on ethanol and BBD—is adequate to reach the statutory renewable fuel volume requirements for 2014-2016, at least after the proposed flow-through of the cellulosic waiver. EPA, therefore, again lacks authority to exercise its general waiver authority to further reduce the renewable fuel volume requirements.

[176] 80 Fed. Reg. at 33,109-33,110.

[177] *Id.* at 33,109.

A. Existing Infrastructure Could Support Substantially More Distribution And Consumption Of E85

EPA asserts that 100-600 mil gal of ethanol could be distributed and consumed as E85 in 2016.[178] EPA offers no quantitative evidence or analysis supporting those numbers. They appear to have been pulled out of thin air. Vastly more robust analyses, described below, show that existing infrastructure could enable between 1 bil gal and 2.15 bil gal of ethanol to be distributed and consumed as E85 over the course of next year.

EPA focuses on the number of FFVs that can access them and the number of stations dispensing E85. EPA assumes that there were about 14 million FFVs in the fleet in 2014, and that this will grow to about 16 million FFVs in 2016, though there is evidence that there could already be as many as 17.4 million FFVs on the road today.[179] And EPA assumes that there are about 3,000 E85 stations nationwide.[180] That is reasonable, as other sources provide similar estimates.[181] Although that means that only about 2 percent of stations offer E85, EPA correctly recognizes that "the fraction of FFVs with access to E85 is higher than 2% since the vast majority of vehicles are within reasonable range of more than one retail station on typical trips."[182]

EPA makes no effort, however, to then estimate the actual proportion of FFVs with access to E85. It notes that *if* that number is 5%, then 800 mil gal of E85 could be consumed under favorable pricing conditions.[183] EPA does not explain its choice of 5%; the number appears to be entirely arbitrary. It also appears irrelevant to EPA's analysis, because EPA immediately proceeds to assert that "it is possible for the market to reach volumes perhaps as high as *600* million gallons under favorable pricing conditions."[184] But EPA does not stop there, spinning out a series of hypothetical scenarios in which between 200 and 600 mil gal of E85 are consumed in 2016.[185] These scenarios equate to merely 66 million to 400 mil gal of incremental

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[178] *Id.* at 33,127-33,128.

[179] *Id.* at 33,121, 33,128 & n.71; *see also* Air Improvements Resource, Inc., *Analysis of Fleet Percentage of 2001+ Model Year Group In Calendar Years 2014, 2015, and 2016*, at 4 (July 27, 2015) ("AIR, *Analysis of Fleet 2001+ Model*") (attached as Exhibit 3).

[180] 80 Fed. Reg. at 33,121 (citing Alternative Data Fuels Center); *see also* 2013 Notice of Proposed Rulemaking E85 Memorandum at 3 (relying on e85prices.com).

[181] Relying on 2013 data from e85prices.com (a source on which EPA has previously relied), Babcock and Pouliot based their analysis on 3,072 stations E85 stations. *See* Babcock & Pouliot, *Price It and They Will Buy*, *supra* note 11, at 10. E85prices.com now states that there are 3,173 E85 stations.

[182] 80 Fed. Reg. at 33,128.

[183] *Id.*

[184] *Id.*

[185] *See id.*

ethanol being consumed through E85 in 2016.[186] EPA does all this without any analysis whatsoever of why 600 mil, 100 mil, or any other volume is the *right* projection, and does not even explain what kind of uncertainty is driving EPA to suggest that there is a range of possible volumes that could be distributed. This is the epitome of arbitrary and capricious action.

The only analyses that could possibly support EPA's levels are those rooted in historical consumption of E85. EPA purports to recognize that historical consumption is an improper basis for this analysis, stating that EPA is required to "envision[] growth in supply beyond historical levels as envisioned by the statute."[187] Yet, EPA remarks, for example: "The fact that the market only achieved about 130 million gallons of E85 in 2013 despite substantial increases in the production and import of non-ethanol blends and the substantial draw-down in the bank of carryover RINs indicates that E85 consumption was constrained," and "a similar situation existed in 2014."[188] EPA's reasoning is fallacious. That market participants decided to draw down banked RINs instead of selling more E85 demonstrates only that at actual RIN price levels, E85 has not been priced at parity with E10 on an energy-equivalent basis. Thus, "[h]istorical consumption of E85 provides a poor predictor of the level of possible consumption because the price of E85 has never been low enough to save owners of flex vehicles money."[189] EPA describes the "poor pricing of E85 relative to E10" as a "constraint[]."[190] It is not; rather, it is an economic consequence of, in part, EPA's failure to set appropriately high renewable fuel volume requirements, as Congress intended.

Nor does EPA explain why it abandoned the approach it took in November 2013 to answer this same question. There, EPA estimated "the fraction of FFVs that have access to E85" to be 8.6%, based on the notion that it would be reasonable to assume that an FFV had access to E85 if one out of four stations near it offered E85.[191] This led EPA to determine that 1.3 bil gal of E85 could be consumed per year (containing 860 mil gal of ethanol)—more than *double* the

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[186] *Id.* at 33,116 n.39 (calculating that it takes 1.51 gallons of E85 to equal one incremental gallon of ethanol in E85).

[187] *Id.* at 33,118.

[188] *Id.* at 33,120.

[189] Babcock & Pouliot, *Feasibility and Cost of Increasing US Ethanol Consumption Beyond E10*, *supra* note 149, at 1.

[190] 80 Fed. Reg. at 33,120.

[191] Memorandum from David Korotney to EPA Air Docket EPA-HQ-OAR-2013-0479, "Application of one-in-four E85 access methodology to 2014," at 5 (Nov. 21, 2013) ("EPA 2013 E85 Memorandum"). EPA further assumed in this analysis that "the geographic distribution of FFVs is consistent with the geographic distribution of service stations." *Id.* at 1.

high-end of the range it uses now.[192] Where did all that E85 distribution capacity go? EPA does not say, which is especially perplexing given that, as EPA itself notes, "[s]ince 2013, the number of FFVs in the fleet and the number of retail stations offering E15 and E85 have grown."[193]

Although EPA's 2013 methodology is better than its current methodology, it too is deficient. For one thing, as we explained in our prior comments, "a driver has access to E85 [so] long as he or she has access to a single E85 station," not whether one in four nearby stations have E85.[194]

A better model that has long been available to EPA would be that of Professors Bruce Babcock and Sebastian Pouliot. They addressed with precision the question of how much E85 could be distributed to FFVs given current infrastructure.[195] Cross-correlating a database of FFV registrations by zip code with a database of E85 stations by zip code, they found that 55% of FFVs were within ten miles of an existing E85 station.[196] Using this ten-mile radius and assuming that each E85 station could dispense no more than 45,000 gal per month, Babcock and Pouliot calculated that with existing infrastructure and adequate pricing, about 1 bil gal of ethanol would be consumed via about 1.2-1.3 bil gal of E85 per year.[197] And if each station could dispense 90,000 gal per month, then about 1.8 bil gal of ethanol would be consumed via about 2.4 bil gal of E85 per year.[198] Although Babcock and Pouliot's analysis was conducted in 2013, their model valid and their results, if anything, understate the amount of E85 that could be

[192] *See id.* at 5. Although EPA calculated this number in 2013 as available distribution capacity, it then discounted this figure significantly because it was improperly seeking to project how much E85 would be consumed without the mandate. *See* 78 Fed. Reg. at 71,762 (calculating "proposed mean volume of 180 mill gal for E85"). EPA now admits that this discounting was erroneous, *see* 80 Fed. Reg. at 33,117 (recognizing that "the approach we took in the November 2013 NPRM underestimated achievable volumes"). But rather than following the natural result of this concession and using its previously calculated 1.3 bil gal distribution capacity, it now simply ignores that it ever calculated this number at all.

[193] 80 Fed. Reg. at 33,121.

[194] Growth Energy Prior Comments on 2014 RFS at 28.

[195] *See* Babcock & Pouliot, *Price It and They Will Buy*, *supra* note 11; Bruce A. Babcock and Sebastien Pouliot, "Impact of Sales Constraints and Entry on E85 Demand" (Aug. 2013), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/13pb12.

[196] *See* Babcock & Pouliot, *Price It And They Will Buy*, *supra* note 11, at 9-10 (calculating that 8 million out of 14.6 million FFVs at the time were located in zip codes with a geographic center within 10 miles of an E85 station).

[197] Babcock & Pouliot, "Impact of Sales Constraints and Entry on E85 Demand," *supra* note 195, at 3; Babcock & Pouliot, *Feasibility and Cost of Increasing US Ethanol Consumption Beyond E10*, *supra* note 149, at 5. Conversion to 1.33 bil gal of E85 uses Babcock's assumption that E85 contains 75% ethanol. Babcock & Pouliot, "Impact of Sales Constraints and Entry on E85 Demand," *supra* note 195, at 5 n.6.

[198] Babcock & Pouliot, "Impact of Sales Constraints and Entry on E85 Demand," *supra* note 195, at 3.

distributed in 2016. Again, according to EPA, "[s]ince 2013, the number of FFVs in the fleet and the number of retail stations offering E15 and E85 have grown."[199] Indeed, whereas Babcock and Pouliot relied on a database indicating that there were 14.6 million FFVs as of January 2013,[200] as discussed above, there will be at least 16 million FFVs, and possibly more than 17.4 million FFVs, on the road in 2016.

A more recent analysis by Stillwater Associates, a respected transportation fuel consultancy, confirms Babcock and Pouliot's assumption that a station could dispense 45,000 gal of E85 per month. In fact, Stillwater's analysis shows this to be a conservative assumption. Stillwater explains that the 45,000 figure is very close to the amount supported by a *single* dispenser using the standard rule of thumb in the industry for the relationship between dispensers and total gasoline sales.[201] In other words, assuming conservatively that every E85 station has just one E85 dispenser, the 45,000 gal per month throughput would simply mean that this E85 dispenser would be as active as any other E10 dispenser in the station. Treating the *average* E10 dispenser's throughput as the *maximum* throughput of an E85 dispenser renders Babcock and Pouliot's analysis extremely conservative.

Stillwater also prepared a realistic estimate of the maximum amount of fuel that an E85 dispenser could feasibly deliver to customers, assuming that RFS obligations are properly calibrated to ensure that E85 is priced at attractive levels. To conduct this analysis, Stillwater made several reasonable and even conservative assumptions: that each E85 station only has one dispenser with two hoses offering E85; that the average customer fill-up is for 12 gallons, that customers can fill up at only 3 gal per minute; that the transition from one car to the next would take minutes; and that higher concentrations of customers fill up during peak hours.[202] Stillwater concluded that not only is Babcock and Pouliot's upper throughput assumption of 90,000 gal per month per dispenser reasonable, but in fact a single E85 dispenser could feasibly dispense up to 115,000 gal per month—more than 2.5 times Babcock's base assumption.[203]

Taking this throughput and confirmation of Babcock and Pouliot's basic assumption, Stillwater then calculated independently the incremental amount of ethanol that could be consumed given existing E85 infrastructure. Adopting EPA's assumption that there are 3,000 existing E85 stations, assuming that E85 has "an average ethanol concentration of 74 percent,"[204] and accounting for the displacement of E10, Stillwater determined that, if station throughput is 45,000 gal per month, the stations could supply an additional 1.08 bgy of ethanol via E85. Moreover, a recent economic analysis concluded that under these circumstances, D6 RIN prices

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[199] 80 Fed. Reg. at 33,121.

[200] *See* Babcock & Pouliot, *Price It And They Will Buy*, *supra* note 11 at 9.

[201] Stillwater Associates, *Infrastructure Changes and Cost to Increase RFS Ethanol Volumes through Increased E15 and E85 Sales in 2016*, at 12 (July 27, 2015) ("Stillwater Study") (attached as Exhibit 4).

[202] *Id.* at 11.

[203] *Id.* at 11.

[204] *Id.* at 9.

would increase by only about $1.45.[205] Stillwater further found that if station throughput is 90,000 gal per month, the stations could instead supply an additional 2.15 bgy of ethanol via E85.[206]

Stillwater also analyzed the supply chain for E85 and found no bottlenecks. E85 tanks are typically 8,000 to 12,000 gallon capacity.[207] Stations generally receive new deliveries of fuel on a daily basis, and can receive multiple deliveries in a single day when needed.[208] Even assuming a smaller E85 tank, a station receiving a single delivery each day could potentially receive 240,000 gal per month of E85 (8,000 gallons per day times 30 days), which is far more than needed under Babcock and Pouliot's or Stillwater's analysis. This increased consumption of E85 would "have little impact on the distribution system."[209]

In short, EPA's estimate for how much E85 could be distributed to consumers is fundamentally flawed and facially unreasonable. Even the most conservative defensible estimate establishes that, using existing infrastructure, more than 1 bil gal of additional ethanol could be distributed and consumed via E85 annually, and a more realistic estimate indicates that that figure could be more than 2 bil gal.

B. Infrastructure Could Readily Be Expanded To Support Even More Consumption Of E85 In 2016

In addition to the volumes that could be delivered to FFVs using existing infrastructure, the Stillwater study further explains how the industry is more than capable of quickly and cost-effectively growing infrastructure. This additional infrastructure could provide another path to achieving substantially greater consumption of ethanol as E85 in 2016, even taking into account that EPA will not finalize this rule until November 30, 2015.

There are two principal paths by which E85 infrastructure could be expanded: (1) adding a second E85-capable dispenser to existing E85 stations or (2) adding an E85-capable dispenser to stations that do not currently offer E85. Given the distribution and consumption capacity of existing infrastructure, as explained above, this expansion is unnecessary to achieve high volumes of additional E85 consumption in 2016. But these expansion options provide another path to achieving such volumes, and EPA's failure to consider their feasibility further underscores the unreasonableness of EPA's proposed requirements.

Adding an E85 dispenser to an existing E85 station requires minimal investment. Because the station already has an existing E85 tank, there would be no work underground, and all the necessary piping is in place.[210] Rather, all that would be necessary is replacing an existing

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205 *Impact on Motor Fuel Prices* at 5 (attached as Exhibit 1).

206 Stillwater Study at 9, 12 (attached as Exhibit 4).

207 *Id.* at 6.

208 *Id.* at 16.

209 *Id.* at 16.

210 *Id.* at 13.

E10 dispenser with an E85-compatible dispenser (which could be used for E10 if later desired). An E85-compatible dispenser on its own costs $15,000 to purchase and install.[211] For an additional cost, the station could instead install a blender pump, giving it the ability to sell intermediate blends such as E15 or E30 as well.[212]

If the station does not currently offer E85, then in addition to replacing the dispensers it would have to do some modest underground work. Generally, this work would involve cleaning one of the station's E10 tanks, and then replacing certain piping equipment that may not be compatible with E85.[213] Most stations will have no problem using one of their current E10 tanks for E85.[214] At least 50% of stations have at least 3 gasoline tanks, and a number have even 4.[215] Just one would need to be compatible with E85, and virtually all tanks are: all steel tank manufacturers as well as the Steel Tank Institute have affirmatively stated that their tanks are compatible with any ethanol blend up to E100.[216] Among fiberglass tanks (the other type besides steel), double-walled fiberglass tanks built since 1990 can handle up to E100, as can single-walled fiberglass tanks built since 2005.[217] Stillwater estimates the total conversion cost to start offering E85, including installation of the dispenser, to be approximately $30,000.[218]

As Stillwater explains, implementation of this infrastructure expansion could be made faster and more cost-effective by taking advantage of the industry practice of replacing dispensers every seven years.[219] First, the cycle provides the opportunity to substantially reduce the incremental costs of the dispenser replacement: obtaining an E85-compatible dispenser would cost the station just the incremental $5,000 over the $10,000 the station was going to pay anyway for an E10 dispenser.[220] And second, the cycle dramatically increases the ability of the industry to make these changes rapidly. With approximately 155,000 stations nationwide,[221] over 22,000 stations are upgrading every year, and nearly 2,000 stations are upgrading every month. The several thousand stations that will be upgrading in December 2015 and the early

[211] *Id.* at 12.

[212] *Id.* at 29.

[213] *Id.* at 14.

[214] *Id.* at 13.

[215] *Id.* at 29. Though the oil industry speciously claims that expanded E85 can come only at the expense of premium and midgrade gasoline, Stillwater's analysis demonstrates that this is inaccurate. A station only needs 3 gasoline tanks to offer all grades of E10 and E85 because the midgrade E10 can be blended between the regular and premium tanks in the dispenser itself. There are more than enough stations out there with adequate gasoline tanks.

[216] NREL E15 and Infrastructure (http://www.nrel.gov/docs/fy15osti/64156.pdf) at 24.

[217] NREL E15 study at 24 & Appendix C.

[218] Stillwater Study at 14 (attached as Exhibit 4).

[219] *Id.* at 12.

[220] *Id.*

[221] *Id.* at 9.

months of 2016 will be ideal candidates for rapid expansion of E85 infrastructure in response to EPA's enforcement of the RFS. These stations are already planning for the business interruption and will be hiring contractors that can do the necessary work.

Accordingly, taking advantage of this upgrade cycle, Stillwater explains that by phasing in a second E85 pump at about 2,629 existing E85 stations over the course of 2016, enough E85 could be dispensed for 1.52 bil gal of ethanol to be consumed beyond the blendwall, at a total cost of just $35.1 mil.[222] Stillwater's scenario analysis assumes conservatively that throughput is just 45,000 gal per month per dispenser. With that same assumption, Stillwater also finds that by adding a second E85 pump at existing E85 stations that would be replacing a pump anyway according to the seven-year cycle and also phasing in an E85 pump at about 4,150 stations that do not yet offer it over the course of 2016, enough E85 could be dispensed for 1.84 bil gal of ethanol to be consumed beyond the blendwall, at a total cost of $126.6 mil.[223] Stillwater conservatively assumed that preparatory work, such as engineering, hiring contractors, and ordering equipment would occur in December 2015 and January 2016, and that the new dispensers would not come online until February 2016.[224] Finally, building on these assumptions, Stillwater considered a hybrid case, with the same number of stations bringing a new E85 pump online, but this time at both existing and new E85 stations; this scenario yields 1.84 bil gal of ethanol that can be consumed beyond the blendwall, at a total cost of just $93.6 mil.[225] Even at that high level of E85, only about half of the fuel usage by FFVs within 10 miles of an E85 station would need to be E85 to consume it.[226]

These infrastructure costs are exceedingly minor in light of the amount of renewable consumption that they support. For example, in Stillwater's hybrid case, the expanded infrastructure costs $93.6 mil for an additional 760 mil gal of annual production (1.84 bil minus 1.08 bil).[227] That's roughly $0.12 per annual gallon. But since the infrastructure expansion has value for seven years, this cost should be amortized over sales over that extended period. Moreover, this does not even consider the additional profits that a station would garner by attracting more E85 sales and in-store traffic. In short, stations or obligated parties would need to capture an exceedingly small portion of the RIN price to justify these investments

In fact, there is ample reason to believe that, given this potential, the market already will have a strong head-start on reaching the 1.84 bil gal target before EPA finalizes this rule. Speedway, one of the Nation's largest chains, has stated that it is adding E85 capability in every newly built station and most upgraded stations: it informed Stillwater that they are targeting 275 E85 pumps in 2015 and the same number in 2016.[228] Furthermore, as Stillwater indicates, a

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[222] *Id.* at 13.

[223] *Id.* at 14-15.

[224] *Id.* at 14.

[225] *Id.* at 15.

[226] *Id.* at 16.

[227] *Id.* at 15.

[228] *Id.*

"number of other companies, such as Kum & Go, Kwik Trip, Thorntons, Spinx, Rebel Oil, Break time (MFA), MFA Oil, Meijer Gas, Super Pantry, Bosselman's Pump & Pantry, Kroger, Murphy, Petro Serve USA, and Road Ranger all have significant programs to increase E85 stations, such that E85 will be offered at 18 percent to more than 25 percent of each companies' stations."[229] These convenience store chains offer a particularly strong competitive advantage to grow infrastructure quickly, as they bring economies of scale and can apply the lessons of prior experience to many stations at once.

Further accelerating this investment will be the USDA's Biofuel Infrastructure Partnership grant program. That program will pay up to $100 million in infrastructure costs associated with bringing ethanol blends above E10 to market, including 75% of pump costs and 25% of tank and related equipment costs.[230] Through the industry's "Prime the Pump" initiative, many States have already filed applications for grants under this program. USDA expects to transfer the funding by September 30, 2015, giving plenty of time for these funds to be useful in delivering renewable volumes throughout 2016.

To be sure, one challenge with growing E85 infrastructure is the vise grip that the oil industry has over stations that sell their branded gasoline—approximately half of the stations nationwide.[231] Oil refiners often contractually require distributors to sell only those branded fuels that the refiner produces or makes available, but then the refiners rarely make available branded forms of renewable fuels like E85.[232] Such agreements also typically preclude retailers from offering higher-blend fuels like E85 under the branded canopy or at all.[233] Should a retailer violate the terms of its onerous agreement with an oil company, the penalties are typically severe, including termination of the entire agreement.[234] Thus, as of July 2014, independent or unbranded stations were four to six times more likely to offer E85 than stations carrying a "Big Five" oil brand.[235]

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[229] *Id.* at 15-16.

[230] *See* U.S. Department of Agriculture, "Notice of Funds Availability (NOFA): Biofuel Infrastructure Partnership (BIP) Grants to States," 80 Fed. Reg. 34,363 (June 16, 2015).

[231] *See, e.g.*, Elizabeth Douglas & Gary Cohn, *Refiners Maintain a Firm but Legal Grip on Supplies*, L.A. TIMES, June 18, 2005 ("[D]eclining station count has weakened competition and made it easier for the state's major oil companies to impose their will on gas station owners, down to the profit earned on each gallon sold, dealers contend."), *at* http://www.latimes.com/news/la-fi-calgas18jun18,0,3198403.story?page=1.

[232] *Id.* at 4.

[233] *See* Clean Fuels Foundation, *E85 and Blender Pumps: A Resource Guide to Ethanol Refueling Infrastructure*, at 23 (2011) ("[F]ranchise agreements generally do not allow the sale of ethanol blends other than 10% or 85% by volume."), *at* http://www.ffv-awareness.org/docs/11CFDC-004_Pump_Brochure_Indv.pdf.

[234] Renewable Fuels Association, *Protecting the Monopoly*, *supra* note 149, at 10.

[235] *See id.* at 1. The "Big Five" oil companies are BP, Chevron, ConocoPhillips, ExxonMobil, and Shell.

But these restrictions are certainly no basis on which EPA could grant a general waiver. Congress recognized that higher volume requirements would create the right incentives for the oil industry to ease or eliminate these restraints so that E85 could flow more freely to consumers. EPA therefore has the power to force the change that Congress sought when it enacted the EISA. In any event, because 50% of stations are *not* branded by one of the top fifteen oil refiners,[236] there is plenty of opportunity for independent stations to double E85 capacity without the cooperation of major oil companies.

C. Infrastructure Could Readily Be Expanded To Support Significant Consumption Of E15 In 2016

In 2013, the oil industry told the United States Supreme Court that EPA's authorization to use E15 gave its members "the opportunity—and, in light of the RFS requirements, the obligation—to introduce E15 into their systems to increase the total volume of renewable fuel."[237] Indeed it does. Yet EPA assumes that no meaningful level of E15 could be consumed in 2016 and places no pressure on the industry to change that. EPA says that there are only about 100 stations offering E15, and asserts that "[e]ven if this number grows more quickly in 2015 and 2016 than it did previously, such increases would probably not increase total ethanol consumption by more than 5-10 million gallons in comparison to the use of ethanol in E10."[238] Besides the number of stations, EPA limits E15 potential on the ground that customers with vehicles of model year 2000 or later ("MY2001+") may "be reluctant to use E15 even if legally permitted to do so" because they believe that their engine warranty does not cover using E15 or

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[236] NACS, "How Branded Stations Operate," http://www.nacsonline.com/YourBusiness/FuelsReports/GasPrices_2013/Pages/ChallengesRemainBeforeE15UsageIsWidespread.aspx (last visited July 27, 2015).

[237] *See* Pet. for a Writ of Cert., *AFPM v. EPA*, No. 12-1229, at 25-26 (U.S. Apr. 10, 2013).

[238] 80 Fed. Reg. at 33,126.

for other (unstated) reasons.[239] So significant are these constraints in EPA's mind that EPA omits consideration of E15 from its 2016 analysis.[240]

One would naturally then expect to find somewhere in the proposal or EPA's supporting materials, some analysis explaining why the number of E15 stations could not grow significantly in the next year if provided incentive to do so under the RFS program, or a concrete assessment of how many drivers might actually have warranty concerns. Yet, EPA provides nothing of the sort. Rather, EPA takes the 100 stations offering E15 as a *given*, without any justification, and proceeds to estimate how much incremental ethanol would be sold through those same stations.[241] It does this by calculating the average gasoline sales in a station, and then discounting the result by an arbitrarily selected factor of 50% based on the possibility that vehicle owners may nevertheless choose to buy E10, particularly those whose vehicle warranties may not cover E15 usage.[242]

There are numerous flaws with this analysis, not least of which is that it flies in the face of EPA's acknowledgment that "the market is capable of responding to ambitious standards by expanding infrastructure and modifying fuel pricing to provide incentives for the production and use of renewable fuels."[243] Methodologically sound analysis shows in fact that, through infrastructure expansion that could be executed quickly and cheaply, more than 21 bil gal of E15, containing more than incremental 1 bil gal of ethanol over E10, could be distributed in 2016.

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239 *See* Memorandum from David Korotney to EPA Air Docket EPA-HQ-OAR-2015-0111, "Projection of potential E15 consumption and its impacts on total ethanol consumption," at 3 (June 10, 2015) ("EPA 2015 E15 Memorandum")

240 EPA considers E15 to be a wash with E0, of which it estimates will reduce ethanol consumption (versus E10) by 13 mil gal in 2016. 80 Fed. Reg. at 33,126. Apart from that, EPA correctly recognizes that E0 poses no meaningful constraint on ethanol consumption. Although the oil industry (taking a page out of its E15 playbook) continues to manufacture concern about damage E10 could do to small engines, in fact that concern does not exist and is unwarranted. Even the Outdoor Power Equipment Institute states that "We pump E10 without a second thought." http://opei.org/power-gear-group-warns-against-high-ethanol-gas-store-signs-highlight-damaging-effects-of-e15-gas-2/. E10 has been used successfully in marine engines for 30 years, being approved for use by numerous popular marine manufacturers. *See* Governors' Biofuels Coalition, *Ethanol Industry Weighs in on API E0 Claims*, *at* http://www.governorsbiofuelscoalition.org/?p=13412. And as EPA recognized in its E0 docket memorandum, the entire volume of marina gasoline consumption is 250 mil gal per year. "Estimating E0 Volume Sold in U.S. at marinas" Docket Memorandum at 2 [on share drive under supporting materials]. One need not tarry with how much of this is actually E0; even if it all were, this would indicate a microscopic adjustment to total gasoline consumption of 137 bil gal per year, having no effect on the amount of ethanol that can be consumed as E10.

241 *See* EPA 2015 E15 Memorandum.

242 *Id.*

243 80 Fed. Reg. at 33,108.

1. Distribution constraints

Despite the substantial market uncertainty caused by EPA's failure to promulgate RVOs for 2014 or 2015, the number of stations offering E15 has been growing. In April, Kum & Go, the Nation's fifth largest privately owned and company-managed convenience store chain, announced that it will add E15 to 65 stores across seven states.[244] This followed Sheetz Convenience Stores' announcement that it would add E15 to 60 stores in North Carolina over the next year,[245] and Murphy USA's decision to bring E15 to Chicago and Houston after successful tests in Iowa.[246] In 2014, MAPCO Express, Inc. announced that it would offer E15 at all pumps in 100 locations.[247] EPA's analysis—which appears to have been written in early 2014—discusses the MAPCO expansion but is not updated for the more recent announcements.[248] As with E85, there is simply no room to doubt that the industry could bring even more E15 to market if only EPA would provide the necessary price incentives by implementing the RFS program as Congress intended.

There are two principal paths for expanding the availability of E15, neither of which EPA considers in its proposal: (1) blending E15 at the terminal, or (2) blending E15 at the station. Both can be accomplished quickly and with only modest investment.

The first readily available path for bringing E15 to market would be to start blending it at the terminal. Typically gas stations obtain fuel from a distributor, which in turn buys that fuel at a refining terminal (colloquially, the "rack"). Distributors can purchase E10 from refining terminals, but to our knowledge E15 is not sold in a single terminal anywhere in the country. There is no reason for this limitation, however, apart from the oil industry's efforts to obstruct the expansion of E15. Because the terminal blends the ethanol into the gasoline while it is dispensing the fuel to the tanker truck, a simple change to terminal programming would allow it to increase the blend from 10% to 15%.[249]

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[244] *Kum & Go to Offer E15 Fuel Options in 2015* (Apr. 27, 2015), *at* http://www.kumandgo.com/2015/04/e15-fuel-options/.

[245] *Sheetz to Offer E15 Fueling Option in 2015* (Jan. 20, 2015), *at* http://www.prnewswire.com/news-releases/sheetz-to-offer-e15-fueling-option-in-2015-300023113.html

[246] *Murphy USA Bringing E15, E85 to Chicago & Houston,* CSP net.com, CSP Daily News (Feb. 12, 2015), *at* http://www.cspnet.com/fuels-news-prices-analysis/fuels-news/articles/murphy-usa-bringing-e15-e85-chicago-houston.

[247] Renewable Fuels Association, *Major Breakthrough for E15—MAPCO to Offer E15 in 2014*, *at* http://www.ethanolrfa.org/news/entry/major-breakthrough-for-e15-mapco-to-offer-e15-in-2014/.

[248] The memorandum is undated, but uses data as of February 2014 and discusses what might occur over the course of March to December 2014. *See* EPA 2015 E15 Memorandum at 1.

[249] Stillwater Study at 20 (attached as Exhibit 4).

Once terminals start offering E15—which would happen if EPA actually adhered to the volume requirements mandated by Congress and E15 proved to be a relatively cost-effective means for obligated parties to comply—stations would require very little additional investment to receive and dispense E15. Most stations are already E15-compatible.[250] The vast majority of stations already have a tank compatible with E15.[251] Both manufacturers of fuel dispensers fully warranty their standard dispensers for E15 usage.[252] Stations would only need to purchase a retrofit kit, which costs $2,000 per dispenser including installation, in order to comply with any Underwriter Laboratories listing requirements.[253]

With respect to piping and other equipment, Stillwater explains that the costs of upgrading depend on how recently the station has been upgraded. Stations upgraded in the last five years will have already done the work to get most of their equipment E15-compatible, because since 2010, the equipment used in these upgrades has been E15-compatible, even if the station was not seeking to add E15.[254] It would cost these stations only $1,000-$1,500 to upgrade, on top of the retrofit kits.[255] Stations that last upgraded longer ago than that would cost $7,000-$8,000, in addition to the dispenser retrofit kit.[256]

The second readily available path for bringing E15 to market would be to blend it at the stations. That is, the station generally would put E85 into an existing gasoline tank, and then it could deliver E15 to the consumer through a blender pump that blends E85 with E10 to make E15 as the consumer is filling up his or her vehicle. This alternative is more expensive because of the required investment in blender pumps.[257]

The next question is where these investments could be made to achieve meaningful volumes in 2016. A full nationwide switch from E10 to E15 is currently limited by various regulatory constraints, including EPA's refusal to accord E15 a one pound-per-square-inch Reid Vapor Pressure ("RVP") waiver and by certain states' restrictions on E15 consumption.[258] We

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[250] *Id*. at 27.

[251] *Id*. at 6, 13.

[252] Letter from Patrick Jeitler, Dispenser Project Manager—North America, Wayne, dated Jan. 14, 2014 (attached as Exhibit 5); Gilbarco Veeder-Root, *Gilbarco Expands Standard Fuel Dispenser Warranty From E10 to E15* (Mar. 31, 2010), *at* http://www.gilbarco.com/us/content/gilbarco-expands-standard-fuel-dispenser-warranty-e10-e15.

[253] Stillwater Study at 27 (attached as Exhibit 4); Gilbarco Veeder-Root, *Frequently Asked Questions*, *at* http://www.ethanolretailer.com/images/uploads/GilbarcoRetrofitKitE15(2).pdf (explaining UL-listing issue).

[254] Stillwater Study at 27-28 (attached as Exhibit 4).

[255] *Id.*

[256] *Id.*

[257] *Id*. at 29.

[258] *Id*. at 17-19.

discuss below why EPA's refusal to grant E15 an RVP waiver is mistaken. In any event, a recent Stillwater analysis assumed all of these constraints would remain in place in 2016,[259] and still concluded that there is substantial opportunity for growth in renewable usage through E15.

In particular, Stillwater conservatively estimated that under current regulations E15 sales could generate an incremental 1.6 bil gal of ethanol consumption in 2016, by displacing 32 bil gal of E10 sales in strategically targeted parts of the country.[260] These volumes come from three different types of markets:

- *RFG zones.* E15 can be sold in any RFG zone that is in a state without E15 restrictions. This is because the gasoline blendstock for RFG gasoline already has a lower RVP, and so E15 would not require a waiver in these areas.[261] E15 sales in these areas could account for 670 mil gal incremental ethanol consumption annually.[262]

- *Conventional zones outside of the summer season.* Because the RVP issue only applies during the summer ozone season, E15 can be sold in any part of the country without existing state restrictions from mid-September to the end of May.[263] Conservatively reducing this timeframe by one month to account for station transitions, Stillwater concluded that incremental ethanol consumption in this market could be 880 mil gal annually through E15.[264]

- *Areas near low RVP-blendstock terminals.* A number of terminals throughout the country sell gasoline blendstock with a low RVP; stations close to such terminals and in States without restrictions can purchase this blendstock and then use station blending to produce an E15 blend that satisfies RVP requirements, any time of year.[265] Stillwater conservatively estimates 60 mil gal of annual incremental ethanol consumption from this pathway.[266]

In a further conservative adjustment, Stillwater reduces these volumes to account for the fact that about 11% of the vehicle miles traveled in 2016 will be by MY2000 and earlier

[259] *Id.* at 17-24.

[260] *Id.* at 25.

[261] *Id.* at 22.

[262] *Id.* at 25.

[263] *Id.* at 22.

[264] *Id.* at 25.

[265] *Id.* at 22-23.

[266] *Id.* at 25.

("MY2000-") vehicles that cannot use E15.[267] As a result, the total E15 market potential should be reduced from 1.60 bil gal of incremental ethanol per year to 1.43 bil gal.[268]

2. Infrastructure expansion plan

Implementing the pathway described above in time to have an impact on 2016 consumption levels would be feasible. EPA would not issue an appropriately higher 2016 renewable fuel volume requirement until November 30, 2015, leaving the industry with little time to expand infrastructure before 2016. But contrary to EPA's refusal to even consider the possibility of E15 expansion, substantial growth in E15 stations is nonetheless achievable in a rapid timeframe when focused on the above market opportunities.

Applying a layered phase-in that takes advantage of the industry's seven-year upgrade cycle but does not begin until after EPA finalizes the volumes on November 30, 2015, Stillwater presents a terminal-blending scenario in which the market achieves 710 mil gal in incremental ethanol distribution through E15 over the course of 2016.[269] This number is lower than the 1.60 bil gal potential because Stillwater assumes that no volume is produced in the last month of 2015, and that station upgrades are then spread out over the course of the following year.[270] Stillwater also presents an expedited implementation scenario, where the expansion is spread over just the first six months of 2016.[271] Under the expedited scenario, the market could provide 1.06 bil gal of incremental ethanol beyond the blendwall in 2016.[272]

All told, Stillwater calculates that this expansion could be achieved with approximately \$255 million in total costs.[273] Stillwater also explains why this scenario is quite realistic with the right price incentives, even though it envisions upgrades at approximately 32,000 stations over 2016.[274] Because the market regularly handles upgrades at 22,000 stations a year,[275] the number of stations that would be making these E15 upgrades would be on the order of typical upgrade patterns. In fact, the upgrades made by the retrofit kits are orders of magnitude *less* intensive than tearing out and replacing the dispensers at a particular station. The work could proceed in parallel by various contractors, and in the face of EPA enforcing a strong RFS mandate, some stations would be eager to lead the crowd and thereby drive sales.

[267] *See* Air, *Analysis of Fleet 2001+ Model*, at 3 (attached as Exhibit 3).

[268] *See* Stillwater Study at 25 (attached as Exhibit 4).

[269] *See id*. at 25-26.

[270] *Id.*

[271] *Id*. at 26.

[272] *Id*.

[273] *Id.* at 29.

[274] *Id.* at 25.

[275] *Id.*

To be sure, achieving this scenario would be difficult if oil companies continue to obstruct E15 at every turn. Refining terminals would have to start offering E15 at the refining terminal, as using blender pumps to achieve the same volumes would be significantly more expensive. And oil companies would have to stop contractually restricting branded stations from selling E15. But just as with E85, EPA cannot permit oil company obstruction to become a self-fulfilling prophesy. Rather, EPA should assess the general waiver from the perspective of whether the requisite volumes could be achieved if all industry players were cooperatively working towards that goal, and set volume requirements at levels that would encourage such action. Just as E10 consumption increased substantially over a number of years when the industry, faced with appropriate incentives, began to cooperate, there is no doubt that the same could happen for E15 when unimpeded by oil industry obstruction.

3. Consumption constraints

One might reasonably think that even if "supply" means "supply of blended transportation fuel (containing renewable fuel) to consumers," it would stop at the pump. By any reasonable definition, anything that affects consumers' willingness to consume the product must be demand. But in EPA's view, "the availability of qualifying renewable fuels and constraints on their *supply to vehicles that can use them* are valid considerations under … the general waiver authority."[276] Thus, under EPA's interpretation of the general waiver provision, we must consider the volume of vehicles that can consume E15.

FFVs, of course, can consume E15. And several years ago, EPA determined that E15 is safe to use in MY2001+ vehicles, and accordingly approved E15 for use in those vehicles.[277] Today, about 85% of miles traveled and energy consumed are by vehicles approved for E15 use.[278] That figure is expected to increase to about 89% in 2016.[279] The notion that E15 could be harmful to the engines in most vehicles on the road, whether warrantied for E15 or not, is

[276] 80 Fed. Reg. at 33,106 (emphasis added).

[277] *See* EPA, *Partial Grant and Partial Denial of Clean Air Act Waiver Application Submitted by Growth Energy To Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Decision of the Administrator*, 75 Fed. Reg. 68,094, 68,122 (Nov. 4, 2010) ("[W]e believe that the durability testing performed by DOE as discussed in section IV.A.1 above is sufficient to provide assurance that MY2007 and newer motor vehicles will not exhibit any serious materials incompatibility problems with E15."); *see id.* at 68,120-68,122 (discussing, among other things, possible damage to fuel pumps); EPA, *Partial Grant of Clean Air Act Waiver Application Submitted by Growth Energy To Increase the Allowable Ethanol Content of Gasoline to 15 Percent; Decision of the Administrator*, 76 Fed. Reg. 4662, 4681 (Jan. 26, 2011) ("EPA does not expect that there will be materials compatibility issues with E15 that would cause MY2001-2006 light-duty motor vehicles to exceed their evaporative emission standards over their FUL. … In addition, the results of the DOE Catalyst Study support this conclusion, as E15 was used for long-term aging of the vehicles and the Study did not uncover any emissions deterioration problems with E15 in comparison to E0 that would result in materials compatibility issues.").

[278] Air, *Analysis of Fleet 2001+ Model*, at 3, Table 1 (attached as Exhibit 3).

[279] *Id.*

baseless, and EPA rightly does not credit it. EPA's decision was based partially on its own analysis and partially on a "rigorous, thorough, and peer-reviewed study" of the effects of E15 conducted by the Department of Energy's Oak Ridge National Laboratory, which had found "no statistically significant loss of vehicle performance (emissions, fuel economy, and maintenance issues) attributable to the use of E15 fuel compared to straight gasoline."[280] And the National Renewable Energy Laboratory critically analyzed 33 unique research studies on E15 and concluded that these studies "do not show meaningful differences between E15 and E10 in *any* performance category."[281]

Nevertheless, for years the oil industry has engaged in a sustained disinformation campaign to manufacture doubt about E15, scaring consumers about potential engine damage.[282] The cornerstone of this effort has been a 2012 paper by the Coordinating Research Council ("CRC").[283] In a detailed critique, the Department of Energy called the CRC study "significantly flawed."[284] DOE explained that CRC "failed to establish a proper control group, a standard component of scientific, data-driven testing," and in fact did not include E10 in its testing, even though E10 is "the de facto standard gasoline for all grades."[285] Moreover, it used an "arbitrary criterion" in its testing that is "not [a] reliable indicator of durability issues" and "not a standard previously employed by either industry or federal agencies during testing."[286] And, "the CRC

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280 *Getting It Right: Accurate Testing and Assessments Critical to Deploying the Next Generation of Auto Fuels,* energy.gov, (May 16, 2012) ("*Getting It Right*"), *at* http://energy.gov/articles/getting-it-right-accurate-testing-and-assessments-critical-deploying-next-generation-auto.

281 Robert L. McCormick et al., National Renewable Energy Laboratory, Review and Evaluation of Studies on the Use of E15 in Light-Duty Vehicles 1 (Oct. 2013) (emphasis added), *at* http://ethanolrfa.org/page/-/rfa-association-site/studies/RFA%20NREL%20Review%20and%20Evaluation%20of%20E15%20Studies.pdf.

282 *See* Laura Litvan, *Bid to Repeal Ethanol Mandate Seen Diluted by EPA Change*, BLOOMBERG, Aug. 8, 2013 ("The American Petroleum Institute began an advertising blitz last month designed to build pressure for a repeal of the federal biofuel rule, with TV, radio and print ads that focus on potential costs to consumers. One print ad says the higher ethanol mandate 'could damage your engine, and void your warranty. Your engine won't like it, but your mechanic will.'"), *at* http://www.bloomberg.com/news/2013-08-08/bid-to-repeal-ethanol-mandate-seen-diluted-by-epa-change.html. A clip of the advertisements can be seen here: http://www.keloland.com/newsdetail.cfm/ad-against-ethanol-causes-controversy/?id=150809.

283 *See* API-AFPM Pet. for Partial RFS Mandate Waiver, Dkt # EPA-HQ-OAR-2013-0747, at 17-18 (Aug. 13, 2013) (relying on this study in seeking RFS waiver).

284 *Getting It Right*, *supra* note 280.

285 *Id.*

286 *Id.*

decided to select several engines already known to have durability issues, including one that was subject to a recall involving valve problems when running on E0 gasoline and E10."[287]

Apart from the baseless concern that E15 could damage engines in approved vehicles, another category of apparent constraint on greater use of E15 is the suggestion, which EPA apparently credits, that consumer fear that use of E15 in MY2001+ vehicles, although approved by EPA, will nonetheless void engine warranties that do not explicitly approve use of E15. Even if these concerns were legitimate, they would not be an appropriate basis for exercising EPA's general waiver authority because they affect only consumer demand, not supply of transportation fuel (or renewable fuel). As EPA itself puts it, these factors relate to whether "vehicle owners may be reluctant to use E15,"[288] which would be the case even if stations were overflowing with E15. These concerns, therefore, are not relevant to ascertaining the amount of "supply" for purposes of the general waiver provision, even under EPA's flawed interpretation.

In any event, such warranty concerns are wildly overstated. Drivers of FFVs, of which there will be at least 16.32 million on the road in 2016,[289] will not have any warranty concerns about using E15. Nor will drivers of non-FFVs whose warranties explicitly approve the use of E15. Based on a conservative analysis of information from automaker manuals and EPA's own models, it is projected that 32.9 million vehicles on the road in 2016 will carry E15 warranties.[290] This number will only get higher over time because newer cars are far more likely to be warrantied for E15 and older cars are retired. In addition, owners of vehicles that are out of warranty should not be concerned that using E15 could nonetheless void the warranty. It is projected that at least 101.6 million non-FFV MY2001+ vehicles on the road in 2016 will be out of warranty.[291] Combining these three groups (FFVs, vehicles explicitly warrantied for E15, and out-of-warranty vehicles approved by EPA for E15), in 2016 at least 150.82 million vehicles—65% of the total vehicle population[292]—could consume E15 not only safely but also without fear that doing so would void the engine warranty.

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[287] *Id.* The oil industry also has relied on another flawed study by the CRC, published in January 2013. *See* CRC, *Durability of Fuel Pumps and Fuel Level Senders in Neat and Aggressive E15*, CRC Report No. 664 (Jan. 2013), *at* http://www.crcao.com/reports/recentstudies2013/CRC%20664%20%5BAVFL-15a%5D/AVFL%2015a%20%5BCRC%20664%5D%20Final%20Report%20only.pdf. This study was very limited, finding that a single type of fuel pump failed when soaked in E15, but recognizing that this result contradicted two prior studies, including one by CRC. *Id.* at 11-12. NREL determined that this January 2013 CRC study was "inconclusive." NREL Study at 3.

[288] EPA 2015 E15 Memorandum at 3.

[289] 80 Fed. Reg. at 33,121, 33,128 & n.71; *see also* AIR, *Analysis of Fleet 2001+ Model*, at 4 (attached as Exhibit 3).

[290] Air, *Analysis of Fleet 2001+ Model*, at 6 (attached as Exhibit 3).

[291] *Id.* at 7.

[292] The total vehicle population for 2016 is projected to be 232.1 million. *Id.* at 4.

Finally, the oil industry has also tried to discourage consumers from using E15 by sometimes requiring E15 to be sold from the yellow hoses (typically devoted only to E85 FFVs)[293] or by requiring dire warnings (in addition to the warnings already required by federal or state law) on dispensers that are patently intended to confuse and deter potential customers.[294] Such practices further demonstrate that certain obligated parties have been actively engaging in behavior to suppress the distribution of higher volumes of E15. If EPA proposed a higher renewable fuel volume requirement, however, obligated parties would have the proper incentives to stop such efforts to undermine the RFS program.

4. EPA should take additional actions to facilitate greater expansion of E15 distribution and consumption

Aside from setting higher volume requirements, EPA should take other actions to facilitate the expansion of E15 distribution and consumption.

First, EPA should grant a one-pound RVP waiver for E15. The nine-pound RVP limit applies from May to September. Unless made using low-RVP gasoline blendstock, E15's volatility will exceed 9.0 psi. Because low-RVP blendstock is scarce, EPA's denial of a one-pound waiver effectively prevents the sale of E15 during the summer months. Section 7545(h)(4) permits EPA to waive the 9.0 psi limit by one pound, setting a maximum RVP limit of 10 psi for "fuel blends containing gasoline and 10 percent denatured anhydrous ethanol." EPA has flexibly interpreted that phrase to cover "blends of 9-10% ethanol."[295] Although there is no scientific basis for having a different RVP limits for E15, as E15 has a similar volatility to E10 and would behave similarly in terms of evaporative emissions and effects on emissions-control devices,[296] EPA has interpreted section 7545(h)(4) not to permit a one-pound RVP waiver for E15.[297]

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[293] *E15 Pioneer Rebrands Stations*, American Fuels Blog (Oct. 14, 2013) ("The major only allowed him to sell E15 under the canopy from the yellow-hosed flex-fuel dispenser, which would restrict sales to flex-fuel vehicles."), *at* http://www.zarcousa.com/americanfuelsblog/; Cezary Podkul, *Insight: Ethanol lobby sees red over a yellow gas hose in Kansas*, REUTERS (June 10, 2013), *at* http://www.reuters.com/article/2013/06/10/us-e15-rules-phillips66-insight-idUSBRE95907G20130610.

[294] *See* Renewable Fuels Association, *Protecting the Monopoly*, *supra note* 149, at 7 (citing a BP requirement for a gas station in Nebraska that must post labels stating: "**WARNING**: This product is not supplied by BP, and BP does not guarantee this product…. Serious damage can occur to the vehicle if the product is used in a non-compatible vehicle.").

[295] 76 Fed. Reg. at 44,435.

[296] *See* Growth Energy Comments on E15 Misfueling Regulation, EPA-HQ-OAR-2010-0448-83, at 15 (posted Jan. 4, 2011).

[297] *See* 76 Fed. Reg. at 44,433-44,435.

EPA's interpretation is clearly wrong. Just as it would be unreasonable to interpret a sign saying, "You must have four people in your car to use the high-occupancy-vehicle lane,"[298] as prohibiting cars with five or more passengers from using the HOV lane, it is unreasonable to interpret section 7545(h)(4) as setting a maximum for ethanol blends that are eligible for a one-pound RVP waiver. The purpose of section 7545(h)(4) is to promote higher concentrations of ethanol in gasoline, like the purpose of HOV lanes is to promote higher concentrations of people in cars. Thus, it is clear that Congress intended for section 7545(h)(4) to establish a minimum rather than a maximum threshold for the RVP waiver.

Alternatively, and consistent with the purpose of section 7545(h)(4), EPA could invoke section 7545(h)(4)'s "deeming compliant" clause to extend the one-pound RVP waiver to E15.[299] In the E15 misfueling rule, EPA wrote that this clause "is not written as a free standing RVP limit that acts separate and apart from the 1 psi waiver for 9-10% blends of ethanol."[300] That makes no sense and would nullify the deeming clause, whose obvious purpose is to bring within the statute behavior that otherwise would not qualify. Thus by its terms, this clause encompasses *any* fuel that complies with the terms of (A)-(C). EPA also points out that applying the deemed-compliant clause to "blends containing 1%, or 2%, or 5% ethanol" would make no sense in light of the rest of the paragraph, whose function is to create a unique permission for fuels with 10% ethanol content.[301] But again, that rationale does not apply to ethanol blends *above* 10%, such as E15.[302]

Additionally, EPA should finalize its Guidance for E85 Flexible Fuel Vehicle Weighting Factor for Model Years 2016-2019 Vehicles Under the Light-Duty Greenhouse Gas Emissions Program, which it proposed in March 2013, and in doing so revise the proposed treatment of E15.[303] The draft guidance would in effect penalize FFVs for using E15 by not treating it as an alternative fuel (unlike E85). When E15 consumption is high, those volumes of E15 would be considered as having been blended into the base gasoline pool and the amount of alternative fuel is reduced significantly. More importantly, automobile manufacturers receive no greenhouse gas

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[298] *See, e.g.*, National Transportation Library, "4 Rider Pool Cars Only," *at* http://ntl.bts.gov/DOCS/images/HOVFPI/RETKP16.GIF.

[299] That clause provides that a party "shall be deemed to be in full compliance with the provisions of the subsection and the regulations promulgated thereunder if it can demonstrate that— (A) the gasoline portion of the blend complies with the Reid vapor pressure limitations promulgated pursuant to this subsection; (B) the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4) of this section; and (C) no additional alcohol or other additive has been added to increase the Reid Vapor Pressure of the ethanol portion of the blend."

[300] 76 Fed. Reg. at 44,433.

[301] *Id.* at 44,434.

[302] Insofar as section 7545(f)(4) may present additional questions with respect to a 1 psi waiver for E15, Growth Energy is actively working to address those questions with EPA.

[303] EPA, *Draft Guidance for E85 Flexible Fuel Vehicle Weighting Factor for Model Years 2016-2019 Vehicles Under the Light-Duty Greenhouse Gas Emissions Program*, 78 Fed. Reg. 17,660 (Mar. 22, 2013).

emissions credit for using E15 (or higher blends). Ethanol's greenhouse-gas emissions performance is up to 52% better than baseline gasoline (i.e., E0) on a life-cycle basis, so moving from E10 to E15 or higher blends would yield additional greenhouse-gas benefits for light-duty vehicles.[304] Issuing revised guidance to count E15 and medium-blend fuels as alternative fuel for purpose of calculating the "F" factor, which would more accurately reflect these blends' environmental benefits and would encourage car makers to produce more FFVs.

D. Combining Infrastructure Expansion For E85 And E15 Could Readily Support Even Greater Consumption Of Ethanol In 2016

Even greater expansion of E15 infrastructure could be achieved in 2016 by combining E85 and E15 paths. Given that there is little overlap between them, adding a second E85 dispenser to existing E85 stations and also pursuing the expedited expansion of E15 could enable 2.90 bgy of additional ethanol to be delivered in 2016, at a total cost of $348.5 mil.[305]

E. Existing Infrastructure Could Support The Distribution And Consumption Of Nearly The Entire Supply Of Biomass-Based Diesel

EPA also substantially underestimates the amount of BBD that could be distributed and consumed in excess of the proposed BBD mandate. As discussed above, EPA recognizes that existing BBD production capacity is sufficient to generate at least 4.2 bil RINs per year. Yet EPA appears to assume that total BBD production will generate hundreds of millions or even more than one billion fewer RINs than capacity in 2016.[306] EPA gives no explanation for why more available production capacity could not be used.

EPA's low BBD assumption cannot be explained by any distribution- or consumption-related constraint, even if such constraints were cognizable in assessing the general waiver. "The standard heating oil and diesel specifications allow up to 5% biodiesel" blends ("B5"), and thus "all diesel and heating oil equipment and infrastructure is de facto compatible" with B5.[307] Moreover, as EPA recognizes, "essentially all engine manufacturer warranties permit up to 5%

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[304] *See infra* Section X.B; *see also* U.S. Dept. of Energy, Alternative Fuels Data Center, *at* http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last visited June 22, 2015); Air Improvement Resource, Inc., *Emissions Reductions from Current Natural Gas Corn Ethanol Plants* (July 27, 2015) (attached as Exhibit 6).

[305] Stillwater Study at 31 (attached as Exhibit 4).

[306] *See* 80 Fed. Reg. at 33,127, Table II.D.2-2-2 & n.b (indicating EPA's expected range of BBD and conventional biodiesel RIN generation in 2016).

[307] *See* Stratas Report at 11 (attached as Exhibit 2); *see also* http://noraweb.org/wp-content/uploads/2015/05/Developing-a-Renewable-Biofuel-Option-May-2015-R1.pdf (noting that in 2008, definition of No. 2 oil, most common heating oil grade, "was changed to allow up to 5% biodiesel content with the resulting blend being considered fully equivalent to No.2 oil").

biodiesel."[308] Given projected diesel consumption for 2016, 4.091 bil RINs could still be generated from biodiesel up to the B5 blendwall.[309]

The closest EPA comes to explaining its lower expectation is its suggestion that some diesel fuel must "contain no biodiesel to accommodate that used in northern states during the coldest months of the year."[310] This is nonsense. Minnesota—hardly known as a mild winter state[311]—has for years implemented a year-round B5 mandate.[312] Oregon has done the same.[313] New grade specifications have been adopted for biodiesel that are specifically designed to accommodate multi-season use.[314]

Further underscoring the ability of the market to reach well over full B5 consumption is the existence of even higher biodiesel blends. Since 2014, Minnesota has mandated B10 in summer months; it now requires B10 from April through September.[315] Illinois has a history of selling B11 due to certain tax incentives.[316] Moreover, B20 has substantial potential. As EPA recognizes, "most medium and heavy-duty engine manufacturers warrant the use of blends up to B20 in their most recent models"[317]; these vehicles make up over 90% of on-road consumption of diesel.[318]

In addition, as EPA purports to recognize, renewable diesel is not even subject to a blend-wall because it is chemically "indistinguishable from conventional diesel fuel."[319] Thus, there is

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308 80 Fed. Reg. at 33,128.

309 Stratas Report at 15 (attached as Exhibit 2).

310 80 Fed. Reg. at 33,128.

311 *See* Minnesota Department of Natural Resources, Minnesota Facts & Figures—Climate, *at* http://www.dnr.state.mn.us/faq/mnfacts/climate.html (average winter temperature 6 degrees Fahrenheit in northern part and 16 degrees Fahrenheit in southern part) (last accessed: July 17, 2015).

312 Stratas Report at 13 (attached as Exhibit 2).

313 *Id.*

314 *Id.* at 12-13.

315 *Id.* at 13; *see also* Minnesota Department of Agriculture, "About the Minnesota Biodiesel Program," http://www.mda.state.mn.us/renewable/biodiesel/aboutbiodiesel.aspx (last accessed July 17, 2015).

316 Stratas Report at 12 (attached as Exhibit 2); *see* Ron Kotrba, "Illinois supports state B11 tax incentive through 2018," *Biodiesel Magazine* (Dec. 14, 2011), *at* http://www.biodieselmagazine.com/blog/article/2011/12/illinois-supports-state-b11-tax-incentive-through-2018.

317 80 Fed. Reg. at 33,128 (noting further that "B20 could be used in a number of centrally-fueled fleets composed of newer engines without violating manufacturer warranties").

318 Stratas Report at 11-12 (attached as Exhibit 2).

319 80 Fed. Reg. at 33,128.

simply no distribution- or consumption-based constraint whatsoever on using the entire domestic production capacity, which again could generate about 0.362 bil RINs per year.[320]

None of this is to say that EPA's proposed BBD volume requirement is erroneous. That determination is based on EPA's analysis of a number of statutory factors.[321] Because the BBD standard is nested within the advanced biofuel standard, EPA explained that it has "[a]llow[ed] for a larger portion of the advanced biofuel to be unspecified, by setting a lower BBD standard" in order to "maintain[] an incentive for the development and deployment of other non-advanced biofuels."[322] That approach is reasonable. What was not reasonable was failing to fully account for the BBD that could be distributed and consumed in excess of the proposed BBD volume when setting the total renewable fuel volume requirement. In that analysis, the only factor to consider is whether there is "inadequate domestic supply." And even if EPA were right that that factor accounts for constraints on distribution and consumption, EPA would still have substantially understated the supply of BBD.

F. Sufficient Ethanol And BBD Could Be Delivered To Meet The Statutory Renewable Fuel Volume Requirements After The Proposed Cellulosic Waiver Flow-Through Even Under EPA's Erroneous Interpretation of "Supply"

Accounting for the higher-blend ethanol and BBD that could be distributed and consumed, as described above, shows that, even under EPA's flawed interpretation of the general waiver provision, there is adequate domestic supply to support at least the statutory renewable fuel requirements for 2014, 2015, and 2016, after flowing through the proposed cellulosic waiver. Therefore, EPA may not invoke the waiver authority to reduce the renewable fuel volume requirements further.

EPA explains that, under its proposal for 2016, after accounting for the required volume of non-ethanol cellulosic biofuel and BBD, and for the maximum amount of ethanol that can be consumed as E10 (i.e., the E10 blendwall), an additional 0.84 bil RINs would be needed to reach the renewable fuel volume of 17.40 bil. Because, as explained above,[323] the statutory renewable fuel volume requirement after flowing through the proposed cellulosic waiver is 1 bil higher than EPA's proposed requirement—18.40 bil—this same calculation would mean that an additional 1.84 bil RINs would be needed to reach the statutory requirement after the cellulosic waiver flow-through. Even the most conservative path outlined above could achieve that level, and other paths could far exceed it.

First, consider ethanol. As just discussed, existing E85 distribution and consumption capacity would support the generation of at least 1.08 bil RINs above the E10 blendwall. (Expanded infrastructure could support up to 2.90 bil RINs above the E10 blendwall.) Given

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[320] Stratas Report at 16 (attached as Exhibit 2).

[321] 42 U.S.C. § 7545(*o*)(2)(B)(ii), (v).

[322] 80 Fed. Reg. at 33,135.

[323] *Supra* p.31.

that EPA projects the E10 blendwall for 2016 at 13.69 bil gal, the total amount of ethanol that could be delivered and consumed would be at least 14.77 bil gal. Because that is less than the minimum ethanol production capacity established above of 15.085 bgy, the full 14.77 bil gal could actually be produced and consumed in 2016, which would be 1.08 bil gal above the E10 blendwall that formed the basis of EPA's calculation.

Next, consider BBD. As just discussed, the B5 blendwall would limit the consumption of biodiesel supply to the equivalent of 4.091 bil RINs, and renewable diesel could support another 0.362 bil RINs, for a total of 4.453 bil RINs. And as also discussed above, the production capacity for both of those fuels is at least as high. Therefore, at least 1.753 bil RINs above EPA's proposed BBD volume requirement of 2.7 bil RINs (1.8 bil gal volumetric) could be supported in 2016.

Therefore, under the most conservative assumptions, the feasible production, distribution, and consumption of ethanol and BBD would support 2.833 bil RINs above the E10 blendwall and the proposed BBD requirement in 2016, 0.993 bil more the 1.84 bil additional RINs needed to reach the 2016 statutory requirement for renewable fuel after the cellulosic waiver flow-through.

Moreover, because these conservative throughput volumes of ethanol above the E10 blendwall and BBD are based on infrastructure that exists today and has existed to the same degree at least since 2014, they would have been achievable in 2014 and 2015, as well. Analysis similar to the one just performed for 2016 shows that there also would have been sufficient production, distribution, and consumption to meet the statutory renewable fuel volume requirements after the proposed cellulosic waiver flow-through in 2014 and 2015.

In 2014, the E10 blendwall was 13.64 bil gal.[324] Combined with 1.08 bil gal throughput for higher blends, the system could have delivered (at least) 14.72 bil gal of ethanol. But that exceeds the most conservative estimate of 2014 ethanol capacity, which, as described above, was 13.681 bil gal (though not the higher estimate of 14.8795 bil gal). Therefore, under the most conservative assumptions, only 0.041 bil gal of ethanol beyond the E10 blendwall could have actually been produced, distributed, and consumed in 2014. And given that 4.453 bil RINs could have been generated from BBD, there would have been 2.008 bil RINs from BBD above the proposed BBD volume requirement of 2.445 bil RINs (1.63 bil gal volumetric).

A similar phenomenon would occur for 2015, when EPA assumes the blendwall to be 13.78 bil gal.[325] Combined with 1.08 bil gal throughput for higher blends, the system could deliver (at least) 14.86 bil gal of ethanol. But that exceeds the most conservative estimate of 2015 ethanol capacity, which, as described above, was 14.548 bil gal (though not the higher estimate of 15.077 bil gal). Therefore, under the most conservative assumptions, 0.768 bil gal of ethanol beyond the E10 blendwall could actually be produced, distributed, and consumed in 2015. And given that 4.453 bil RINs would be generated from BBD, there would be 1.903 bil

[324] *Impact on Motor Fuel Prices* at 3 n.12 (attached as Exhibit 1).

[325] 80 Fed. Reg. at 33,115, Table II.A.5-1.

RINs from BBD above the proposed BBD volume requirement of 2.55 bil RINs (1.70 bil gal volumetric).

Therefore, sufficient renewable fuel could have been produced and delivered to consumers, under the most conservative assumptions, to meet the statutory volume requirements for renewable fuel after the proposed cellulosic waiver flow-through—and in fact, to exceed those levels by about 1 billion RINs in each compliance year. Table 5 summarizes this analysis.

Table 5: Supply (Under EPA's Interpretation) to Meet Renewable Fuel Volumes After Cellulosic Waiver Flow-Through					
	E10 blendwall + EPA Proposed Required BBD	**Ethanol Above E10 Blendwall**	**BBD Above EPA Proposed Required BBD**	**Statutory Less Cellulosic Flow-Thru**	**Excess RINs**
2014	16.085	0.041	2.008	17.080	1.054
2015	16.33	0.768	1.903	17.900	1.101
2016	16.56*	1.08	1.753	18.400	0.993

All numbers in billions of RINs
** Also includes non-ethanol cellulosic biofuel*

In short, even under EPA's understanding of the general waiver authority, there was and will be plenty of "supply"—renewable fuel that can be produced and then distributed in transportation fuel to vehicles that can use it—to meet the statutory renewable fuel volume requirements after the cellulosic waiver flow-through in 2014-2016, and therefore EPA cannot exercise its general waiver authority to reduce those requirements further for any of those years.

VI. APPLYING VOLUME REQUIREMENTS WITHOUT A GENERAL WAIVER WOULD NOT BE UNREASONABLE UNDER THE CIRCUMSTANCES

For the many reasons stated above, regardless of which interpretation of the general waiver provision is correct, the supply of renewable fuels is, or will be, adequate in each of the three years subject to this rulemaking to meet the statutory renewable fuel volume requirements after the proposed cellulosic waiver flow-through, without a reduction under the general waiver authority. Although 2014 is long past and 2015 will be nearly over by the time EPA issues its final rule, imposing volume requirements for those years that are higher than actual net RIN generation levels is statutorily authorized and reasonable under the circumstances. Doing so, in fact, would serve Congress's intent far better than imposing requirements based on actual net RIN generation during those years, as EPA proposes.

As a threshold matter, there is no question that EPA has authority to issue renewable volume obligations for 2014 and those parts of 2015 already past.[326] The D.C. Circuit has squarely rejected in two prior cases the argument that a missed RFS deadline precludes EPA

[326] *See id*. at 33,108.

from promulgating renewable volume obligations.[327] As that court explained: "Congress directed EPA to 'ensure' that 'at least' the set volumes [of renewable fuel] were used each year; in light of that directive, and considering the overall statutory scheme and legislative history, … it [is] highly unlikely that Congress intended that EPA's failure timely to issue the … standard would lead to the drastic and somewhat incongruous result of precluding EPA from fulfilling its statutory mandate."[328]

The D.C. Circuit has also repeatedly held that delayed (and thus backward-looking) RVOs are not impermissibly retroactive.[329] "The statute set[s] the renewable fuel obligations, and [obligated parties] ha[ve] no legally settled expectation that EPA would exercise its waiver authority to reduce that obligation."[330] Indeed, EPA "ha[s] clear [but] implicit authority" to impose retroactive volume obligations "in order to achieve the statutory purpose."[331]

A court will uphold such retroactive obligations as long as EPA "balance[s] the benefits and burdens" of imposing them and "consider[s] the suggested alternatives."[332] For example, *Monroe Energy* found that EPA had proceeded reasonably where it mitigated its delayed issuance by extending the compliance deadline that program year.[333] By proposing to adjust the compliance deadline for 2014, EPA has taken a similar approach here.[334] *Monroe Energy* confirms, however, that EPA is not also obligated to reduce the required volumes in order for delayed renewable volume obligations to be upheld as reasonable.[335] To the contrary, the D.C. Circuit's decisions indicate that imposing higher volumes notwithstanding the delay would best "achieve the statutory purpose."[336]

Not only can obligated parties not expect to receive a waiver, they specifically have no basis to object to volume obligations that would require them to exceed the E10 blendwall. As discussed above, they have known about the E10 blendwall and the size of their statutory obligations for 2014-2016 since 2007, and thus they have had years to prepare to overcome the blendwall as necessary to meet those obligations. Their failure to do so is nobody's fault but their own—the product of their deliberate strategy to drag their feet in hopes of persuading EPA

[327] *See Monroe Energy*, 750 F.3d at 919-920; *National Petrochemical & Refiners Ass'n v. EPA*, 630 F.3d 145, 156-157 (D.C. Cir. 2010) ("*NPRA*").

[328] *Monroe Energy*, 750 F.3d at 919-920 (quoting *NPRA*, 630 F.3d at 156-157 (some alterations and internal quotation marks omitted)).

[329] *Id.*; *NPRA*, 630 F.3d at 158-167.

[330] *Monroe Energy*, 750 F.3d at 920.

[331] *NPRA*, 630 F.3d at 163; *see also Monroe Energy*, 750 F.3d at 920 (rejecting argument that *NPRA*'s reasoning only applied to program's first year).

[332] *NPRA*, 630 F.3d at 166.

[333] *Monroe Energy*, 750 F.3d at 921.

[334] 80 Fed. Reg. at 33,108.

[335] *See Monroe Energy*, 750 F.3d at 921.

[336] *NPRA*, 630 F.3d at 163.

that the RFS program is unworkable.[337] By adhering to statutory volume requirements, EPA will properly teach obligated parties to assume that the statutory volume requirements apply and to invest in biofuel infrastructure, as Congress envisioned. Instead, EPA's proposal would teach obligated parties the opposite, that recalcitrance will lead to a decreased compliance obligation.

Moreover, the burden of complying with the statutory renewable fuel volume requirements (after the cellulosic waiver flow-through) for past years would not be difficult. Obligated parties could use the sizeable bank of carryover RINs and the ability to carry forward a RIN deficit[338] to help achieve compliance for 2014 and 2015. As noted above, the statutory renewable fuel volume requirements for 2014 and 2015 after adjusting for the proposed cellulosic waiver flow-through would be 17.08 bil and 17.90 bil. EPA estimates that actual net RIN generation during those years will be 15.93 bil and 16.3 bil.[339] If those estimates hold, there would be a combined RIN shortfall of 2.75 bil over 2014-2015.[340] EPA also estimates that after 2013 compliance, there will be a "bank" of "approximately 1.8 billion [carryover] RINS."[341] If that bank of RINs were to be fully drawn down for compliance, obligated parties could then carry forward a deficit of 0.95 bil RINs into 2016. As discussed below, deficits are a legitimate compliance mechanism under the RFS statutory scheme.[342]

Then, given that the 2016 statutory renewable fuel volume requirement after the proposed cellulosic flow-through is 18.4 bil, obligated parties would need 19.35 bil RINs to achieve full compliance in 2016.[343] That should not be a problem. If, as EPA claims, "supply" as used in the general waiver provision accounts for the volume of transportation fuel that can be delivered to vehicles that can use it, then supply could support, under the most conservative assumptions, at least 19.393 bil RINs in 2016.[344] Alternatively, if "supply" refers only to the amount of renewable fuel available to obligated parties (and it does, as explained above), then supply could support, under the most conservative assumptions, at least 19.494 bil RINs in 2016.[345]

Finally, EPA could further ease the compliance burden by flowing through the proposed cellulosic waiver through to the maximum extent. EPA proposes to waive the cellulosic volume requirement by 1.717 bil gal for 2014 and 2.894 bil gal for 2015. If those full amounts were flowed through, the advanced volume requirements would be 2.033 bil gal for 2014 and 2.606 bil

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[337] Growth Energy Prior Comments on 2014 RFS at 50-53.

[338] Obligated parties can "carry forward" a RIN "deficit" into the next compliance year. 42 U.S.C. § 7545(*o*)(5)(D).

[339] *See supra* Part II.C.

[340] 2.75 = 17.08 + 17.90 - 15.93 - 16.3.

[341] 80 Fed. Reg. at 33,130. Excess RINs can be carried over into the next compliance year. 42 U.S.C. § 7545(*o*)(5)(C).

[342] *See infra* pp.64-65.

[343] 19.35 = 0.95 + 18.4.

[344] 19.393 = 18.4 + 0.993. *See supra* Part V.F.

[345] *See supra* Part IV.B.3.

gal for 2015, and the renewable fuel volume requirements would be 16.433 bil gal for 2014 and 17.606 bil gal for 2015. Given EPA's estimates that actual net RIN generation during 2014 and 2015 will be 15.93 bil and 16.3 bil, the RIN shortfall under these volume requirements would be 1.809 bil—virtually identical to EPA's estimate of the RIN bank. In other words, if the cellulosic waiver were flowed through fully, obligated parties could fully comply with the 2014 and 2015 volume requirements without any need for EPA to exercise its general waiver authority or for obligated parties to carry a RIN deficit forward.

And none of this analysis accounts for the higher projected E10 blendwall level in 2015 and 2016, or for EPA's error in computing the net D6 RINs generated in 2014. Those adjustments would provide hundreds of millions of additional RINs for compliance.[346]

Although higher volume requirements for 2014 and 2015 could not spur greater renewable fuels production or use *in those years*, they would, as discussed in greater detail below, have the salutary effect of consuming the RIN bank, which will then clear the way for the renewable fuel volume requirement and the RIN market to stimulate growth in the production and use of renewable fuels in future, as Congress intended.

For all of these reasons, therefore, retroactively applying the statutory requirements for renewable fuel (with the proposed cellulosic waiver flow-through) in 2014 and 2015 would not be unreasonable.

VII. AT A MINIMUM, EPA SHOULD ADJUST ITS PROPOSAL TO ACCOUNT FOR HIGHER PROJECTED GASOLINE CONSUMPTION

Based on EIA's May 2015 Short-Term Energy Outlook ("STEO"), the proposal assumed that the E10 blendwall would be 13.78 bil gal in 2015 and 13.69 bil gal in 2016.[347] But according to EIA's latest projections of nationwide gasoline consumption, the E10 blendwall, calculated according to EPA's methodology, will be higher by 0.12 bil gal in 2015 (13.90 bil gal total) and by 0.15 bil gal in 2016 (13.84 bil gal total).[348]

Because the proposal bases the renewable fuel volume requirements for these years on the level of the E10 blendwall,[349] these increases in projected gasoline consumption and the E10 blendwall should correspondingly increase the renewable fuel volume requirements. Therefore, at a minimum, the renewable fuel volume requirement should be adjusted to 16.42 bil gal in 2015 and 17.55 bil gal in 2016. And insofar as other computations in this comment rest on EPA's assumptions about the level of the E10 blendwall, those volume requirements should also correspondingly be increased.

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[346] *See supra* Part VII & Part VIII.

[347] 80 Fed. Reg. at 33,115, Table II.A.5-1.

[348] *See* EIA, *Short-Term Energy Outlook*, Table 4a (July 2015); *Impact on Motor Fuel Prices*, at 3 nn.13-14 (attached as Exhibit 1).

[349] *See, e.g.*, 80 Fed. Reg. at 33,115, Table II.A.5-1; *id.* at 33,121-33,129.

VIII. AT A MINIMUM, EPA SHOULD ADJUST ITS PROPOSAL TO CORRECT ITS TREATMENT OF EXPORTED ETHANOL

EPA miscalculated the actual net D6 RIN generation in 2014.[350] Specifically, as the Renewable Fuels Association has pointed out, EPA erroneously assumed that a D6 RIN was generated on all 846 mil gal of exported ethanol and that all of those RINs would be retired and unavailable for compliance, when in fact much of that volume did not generate a RIN, including 370 mil gal of un-denatured ethanol.[351] EPA seems to have recently acknowledged that it erred in this regard.[352] Because EPA subtracted the entire volume of exported ethanol from the volume of produced and imported ethanol to determine net D6 RIN generation for 2014,[353] correcting this error would increase 2014 net D6 RIN generation by at least 370 mil, and would raise total 2014 net RIN generation to 16.3 bil.[354]

Correcting this error could have ramifications in subsequent years as well. That level of net RIN generation—16.3 bil—is identical to the proposed *2015* renewable fuel volume requirement. Because, as EPA recognizes, its task is to "increase the use of renewable fuels in the U.S. transportation system *every year*,"[355] it should at a minimum correspondingly increase its proposed 2015 renewable fuel volume requirement to account for this correction, and should also increase the volume requirement for 2016.

IX. AT A MINIMUM, EPA SHOULD TREAT CARRYOVER RINS AS SUPPLY FOR PURPOSES OF THE GENERAL WAIVER PROVISION

Even if EPA were correct that the statutory renewable fuel volume requirements (even with the cellulosic waiver flow-through) could not be met in 2014-2016, EPA would still have exceeded its authority under the general waiver provision set because of its failure to treat carryover RINs as supply when determining whether "supply" is "inadequate." As long as carryover RINs are available and not treated as supply, incentives will be insufficient to expand the production and use of renewable fuels.

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[350] *See* POET Comment on EPA's Proposed 2014-2016 Standards for the Renewable Fuel Standard Program, EPA-HQ-OAR-2015-0111, at 23 (July 27, 2015) ("POET July 27 Comments").

[351] *See* Renewable Fuels Association, *2014 U.S. Ethanol Exports and Imports, Statistical Summary*, at 1 (2015) ("Denatured ethanol for fuel use accounted for 54% of total exports in 2014, while undenatured ethanol for fuel use made up 43%. Denatured and undenatured ethanol for other industrial use totaled 3%."), *at* http://www.ethanolrfa.org/page/-/rfa-association-site/studies/2014%20U.S.%20Export-Import%20Report.pdf?nocdn=1.

[352] Memorandum from David Korotney to EPA Air Docket EPA-HQ-OAR-2015-0111-1219, "Calculation of ethanol export estimates for 2014" (July 24, 2015).

[353] 2014 RIN Supply, EPA-HQ-OAR-2015-0111-0004.

[354] 16.3 = 15.93 + 0.37.

[355] 80 Fed. Reg. at 33,101 (emphasis added).

A. EPA Must Treat Carryover RINs As Supply When Determining Whether There Is "Inadequate Domestic Supply" For Purposes Of The General Waiver Provision

In its proposal, EPA takes the view that the statute does not "specify how or whether EPA should consider … carryover RINs in exercising its waiver authorities."[356] Instead of requiring obligated parties to consume the RIN bank, EPA proposes to set the volume requirements at an unnecessarily low level in order to permit obligated parties to continue to carry over all these RINs and supposedly preserve "compliance flexibility, market liquidity, and program buffer functions" in future years.[357]

This position, which EPA first expressed in its prior proposal for 2014,[358] represents a significant departure from EPA's earlier position. In past proceedings, EPA took the position that carryover RINs must be counted as supply when determining whether there is "inadequate domestic supply" for purposes of the general waiver provision. For example, in 2010 EPA noted that "it is ultimately the availability of qualifying renewable fuel, *as determined in part by the number of RINs in the marketplace*, that will determine the extent to which EPA should issue a waiver of RFS requirements on the basis of inadequate domestic supply."[359] And in program year 2013, EPA found no basis for "reducing the national applicable volumes" because "the statutory volumes for both advanced biofuel and total renewable fuel can be met in 2013" in part by using RINs carried over from 2012.[360] Notably, the D.C. Circuit previously indicated it was appropriate for EPA to consider the availability of carryover RINs when determining whether supply was adequate for purposes of the general waiver authority.[361]

EPA's about-face is neither procedurally nor substantively valid. An agency must "provide reasoned explanation for its action," which "ordinarily demand[s] that" the agency "display awareness that it *is* changing position" when it does so.[362] EPA has not displayed such

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[356] *Id.* at 33,129.

[357] *Id.* at 33,130.

[358] 78 Fed. Reg. at 71,766-71,767.

[359] 2012 RFS2 Impact Analysis, 75 Fed. Reg. at 14,698; *see also id.* at 14,676 ("These 2009 and 2010 RFS1 RINs will be available and can be used towards the volume requirements of obligated parties for 2010. These RFS1 RINS combined with the RFS2 RINs that will be generated by renewable fuel producers are expected to provide an adequate supply of RINs to ensure compliance for all of the renewable volume mandates.").

[360] 78 Fed. Reg. at 49,795.

[361] 80 Fed. Reg. at 33,130; *Monroe Energy*, 750 F.3d at 919 ("But so long as sufficient RINs exist for obligated parties to meet the fuel standards, the court has no ground to conclude the 2013 standards are unlawful simply because RINs are costlier than in prior years, especially as high RIN prices should, in theory, incentivize precisely the sorts of technology and infrastructure investments and fuel supply diversification that the RFS program was intended to promote.").

[362] *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009); *see Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

awareness, let alone provided a reasoned explanation for its action. Its vague allusions to future "compliance flexibility" and a "buffer" in explaining why a RIN buffer is desirable as a matter of policy will not do.

In any event, EPA's approach is impermissible and misguided, for several reasons. First, it makes no economic sense—a RIN buffer simply would not work as EPA envisions. Second, RINs are a measure of the supply of renewable fuel and must be counted when determining whether "supply" is "inadequate" under the general waiver provision. Third, maintaining a RIN bank would undermine Congress's purpose for the RFS program; the RFS program can achieve its goal of spurring growth in renewable fuels only if carryover RINs are accounted for in determining whether there is "inadequate domestic supply." And fourth, by specifically providing certain mechanisms for "compliance flexibility" and "buffer," Congress foreclosed other means, including maintaining a carryover RIN bank.

As long as EPA refuses to account for carryover RINs, they will simply be used as a substitute for infrastructure investment. That is especially so given EPA's stated intent to maintain a RIN "buffer" by setting low volume requirements and its apparent intent to trigger the reset authority with this proposal. The clear signal EPA is sending the market is that future standards will not drive growth, and therefore banked RINs will not be valuable for much longer. Thus, obligated parties will have a strong incentive to achieve compliance now through low volumes and banked RINs, thereby charting a path to even lower volumes of renewable fuels in the future.

1. A RIN "buffer" would not work as EPA intends

There is no reason to believe that a RIN "buffer" would work as EPA envisions. The proposal assumes that, given the choice between using relatively cheap carryover RINs to meet volume obligations and investing in infrastructure to increase distribution and consumption of renewable fuels, the oil industry will choose the latter so as to preserve their RIN "buffer." Yet to date the oil industry, as described above, has done everything possible to obstruct the deployment of renewable fuel above the E10 blendwall, including refusing to make relatively economical investments in infrastructure for distributing higher-ethanol blends. Indeed, this is exactly what happened in 2013, which EPA recognizes was the first year in which the RFS program should have necessitated exceeding the blendwall; rather than make the requirement investments, however, the industry that year just drew down the carryover RIN bank by approximately 800 million RINs.[363] There is no reason to believe this attitude will change now—certainly EPA's proposal would not provide any economic incentive for such a change. Carryover RINs would only function as EPA hopes if their uses were circumscribed to natural disasters or other extreme scenarios, but they can be used for ordinary compliance.

This is particularly so in light of the signals this proposal sends the oil industry and the implications of the "reset" EPA anticipates. According to EPA Acting Administrator McCabe, the reset process "likely … would take longer than the one year."[364] In the meantime, despite the

[363] 80 Fed. Reg. at 33,130.

[364] Testimony of Janet McCabe, Testimony, *supra* note 5, at 22.

potential for uncertainty created by the reset process, EPA's current proposal, on the heels of its prior proposal for 2014, would give obligated parties strong reason to believe that EPA intends to use the reset power to substantially lower volume requirements in the future. Consequently, there would be little incentive for an obligated party (or any industry player) to choose now to invest in infrastructure it had previously fought to avoid—that investment could well be worthless if EPA were to reset the volume requirements lower. Similarly, there would be no reason for anyone to hold onto carryover RINs because they too would be worthless once EPA reset the volume requirements downward. EPA's assertion that obligated parties would maintain the RIN bank as a "buffer" in light of future "increasing … targets"[365] is therefore absurd. Indeed, the "cliff diving" seen in D6 RIN prices immediately after EPA's proposal was announced confirms that the oil industry believes future compliance, through 2016 and likely beyond, given the implications of EPA's proposal for the reset authority, will be relatively inexpensive under EPA's proposal.[366]

Nor does EPA offer any explanation for why the buffer would need to contain 1.8 bil RINs. In its prior proposal for 2014, EPA's position was that the full bank of 1.2 bil carryover RINs should be preserved as a buffer.[367] EPA, however, never explained why that specific volume was required to provide the desired "flexibility." And now it does not explain why 1.2 bil RINs would not provide a sufficient buffer, or why all 600 mil additional carryover RINs would need to be added to the buffer.

2. RINs are a statutorily prescribed measure of supply

Carryover RINs are, by definition, a measure of the past "supply" of renewable fuels, specifically the excess supply over prior volume requirements.

Congress directed that the regulations EPA promulgates under paragraph (2) of section 7545(*o*) not only ensure that obligated parties meet their volume obligations—obligations that may be waived under the general waiver provision—but also provide "for the generation of an appropriate amount of credits by any person that refines, blends, or imports gasoline that contains a quantity of renewable fuel that is greater than the quantity required under paragraph (2)."[368] Those credits—RINs—thus measure the amount of renewable fuel obligated parties have used in excess of their volume obligations. RINs may be used by obligated parties "to show compliance" with their volume obligations, not just during the compliance year when they were generated but also in the subsequent compliance year—in which case they are called carryover RINs.[369]

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365 80 Fed. Reg. at 33,130.

366 *See supra* Part III.V.

367 78 Fed. Reg. at 71,767.

368 42 U.S.C. § 7545(*o*)(5)(A)(i).

369 *Id.* § 7545(*o*)(5)(C); *see* 2010 RFS2 Impact Analysis, 75 Fed. Reg. at 14,721 ("The accumulation of RINs will continue to be the means through which each obligated party shows compliance with its RVOs and thus with the renewable fuel standards.").

In other words, RINs, including carryover RINs, reflect the supply of renewable fuel and are part of the mechanism for compliance from which the general waiver may provide relief. Accordingly, carryover RINs must be accounted for when determining whether supply is inadequate for purposes of the general waiver provision.

3. EPA's proposal to exclude carryover RINs from consideration would subvert the RFS program

Invoking the general waiver authority to reduce volume requirements below the level where they could be satisfied with carryover RINs, i.e., excluding carryover RINs from consideration of whether "supply" is "inadequate," would also thwart the purpose of the RFS program by undermining Congress's market mechanism for increasing production and use of renewable fuels.

As explained above, the RFS relies on economic incentives to stimulate the distribution and consumption of renewable fuels. The RIN market is the mechanism, and high RIN prices convey the incentive. As blending requirements become more difficult to achieve, RIN prices rise. This gives obligated parties a powerful incentive to invest in new ways to bring renewable fuel to market, such as equipping gas stations to sell E85 and E15, and to stimulate increased consumer demand for those fuels by pricing them competitively. By contrast, low volume obligations yield low RIN prices—which leads to high prices for higher-ethanol blends and little incentive for obligated parties to invest in renewable-fuel distribution infrastructure. The proposal fails to grasp this straightforward economic logic.

Granting the waiver would thus make the recent RIN devaluation permanent, crippling the market incentive Congress intended to stimulate increased production and use of renewable fuel. By contrast, imposing the statutory volumes after the proposed cellulosic waiver flow-through and thereby requiring obligated parties to draw down banked carryover RINs would revive RIN prices and, critically, "incentivize precisely the sorts of technology and infrastructure investments and fuel supply diversification that the RFS program was intended to promote."[370]

4. EPA's "buffer" approach to carryover RINs is foreclosed by the statute's provision of other forms of "flexibility"

EPA maintains that it can and should exclude carryover RINs from consideration of whether "supply" is "inadequate" in order to provide obligated parties with "compliance flexibility" and a "program buffer."[371] But the statute already contains mechanisms to do this, and therefore forecloses EPA from creating a new mechanism for the same end, namely, the RIN bank.

As the proposal notes, Congress provided "compliance flexibility" and a "buffer" by allowing an obligated party "that is unable to generate or purchase sufficient credits" to carry forward a RIN deficit into the next compliance year, giving the obligated party extra time to buy

[370] *Monroe Energy*, 750 F.3d at 919.

[371] 80 Fed. Reg. at 33,130.

or develop the ability to generate more RINs.[372] As EPA's previous statements and regulatory actions demonstrate, the ability to carry forward a RIN deficit is a reasonable and sufficient flexibility mechanism for obligated parties. The 2014-16 proposal itself notes that the RIN-deficit mechanism is available should obligated parties "find compliance with a given year's standards infeasible," and cites this possibility as a reason why EPA can reasonably impose volume obligations for periods already in the past.[373] EPA similarly noted the availability of a deficit carryforward in its prior proposal for the 2014 program year.[374]

Most importantly, EPA has in the past relied on the deficit-carryforward mechanism to provide regulatory flexibility during difficult periods of transition in the RFS—in particular, in its 2010 decision to "combine the [already-past] 2009 and 2010 mandated volumes for biomass-based diesel into a single two-year obligation."[375] The oil industry opposed that decision, but EPA reminded them that under the statute obligated parties would have had a 2009 volume obligation and, "[i]f an obligated party did not satisfy their individual 2009 volume obligation by the end of 2009, then the statute allowed the party to carry the deficit over to 2010."[376] Put simply, the "compliance carryover provisions adopted by Congress" are a fundamental element of the RFS program, and EPA has never in the past found it unreasonable to call upon them.[377]

EPA's only response is to note that because the statutory volume requirements increase year over year, "it may be increasingly difficult" for obligated parties to pay back RIN deficits in future years. But that is entirely consistent with the statutory design: The sharply escalating volume obligations Congress imposed presuppose that it will be "increasingly difficult" for obligated parties to comply. The answer to both EPA and recalcitrant obligated parties is for obligated parties to make the investments needed to permit greater deployment of renewable fuel, which they will do if EPA maintains higher volume requirements.

Congress provided another mechanism for flexibility: the general waiver authority, but under appropriate circumstances. If it turned out that an obligated party was genuinely unable to meet its volume obligations because of "extreme circumstances or natural disasters,"[378] EPA potentially could issue a waiver *then*, on the ground that those circumstances could cause severe economic harm to a State, a region, or the country, or on the ground that *at that time* it had become evident that obligated parties could not obtain adequate renewable fuel to comply with

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[372] 42 U.S.C. § 7545(*o*)(5)(D); *see* 80 Fed. Reg. at 33,130 n.81.

[373] *Id.* at 33,108.

[374] 78 Fed. Reg. at 71,770.

[375] RFS2 Summary and Analysis of Comments, *supra* note 164, at 3-187; *see* 2010 RFS2 Impact Analysis, 75 Fed. Reg. at 14,718.

[376] RFS2 Summary and Analysis of Comments, *supra* note 164, at 3-187.

[377] *Id.* at 3-188.

[378] 80 Fed. Reg. at 33,141.

their obligations.[379] It is premature and frustrates the proper function of the general waiver provision to issue such a waiver now when there is such a sizeable RIN bank.

Given that Congress has already provided EPA with appropriate means of being flexible with obligated parties consistent with the overall purpose of the RFS program, EPA is not free to override the statutorily mandated volumes in order to create another one, particularly when EPA's new mechanism would undermine Congress's intent.[380]

B. Properly Accounting For The Carryover RIN Bank Would Require Higher Total Renewable Fuel Volume Requirements Than EPA Proposes

For the above reasons, EPA must set renewable fuel volume requirements at levels that will consume the entire RIN bank and drive growth in renewable fuels. The simplest appropriate way to do this is to increase the proposed volume requirements up to the level of the cellulosic waiver flow-through, or until the RIN bank would be exhausted, whichever comes first. And this should begin in 2014, so that the 2015 and 2016 volume requirements have the opportunity to drive growth (the 2014 requirement, of course, could not because it covers a past year).

EPA reports that come 2014, the bank will contain "approximately 1.8 billion RINs."[381] As explained above, the statutory renewable fuel volume requirements, after being reduced by EPA's proposed cellulosic waiver flow-through, are 17.08 bil gal for 2014, 17.90 bil gal for 2015, and 18.40 bil gal for 2015.[382] The difference between those volumes and EPA's proposed volumes, which reflect EPA's estimate of actual net RIN generation, is 1.15 bil gal in 2014, 1.60 bil gal in 2015, and 1.00 bil gal in 2016. Consequently, if the 2014 renewable fuel volume requirement were set at the statutory level after the cellulosic waiver flow-through, and if we accept EPA's proposed volume as actual net RIN generation, then 1.15 bil banked RINs would be consumed, leaving 0.65 bil banked RINs. Those RINs could then be fully consumed in 2015 by setting the volume requirement to 16.95 bil.[383] Table 6 summarizes this analysis.

[379] *See* 42 U.S.C. § 7545(*o*)(7)(A).

[380] *See Alexander v. Sandoval*, 532 U.S. 275, 290 (2001) ("The express provision of one method of enforcing a substantive rule suggests that Congress intended to preclude others.").

[381] 80 Fed. Reg. 33,130.

[382] *See supra* p.31.

[383] 18.63 = 17.9 + 0.73.

Table 6: Renewable Fuel Volumes With Maximum Carryover RIN Drawdown			
	2014	**2015**	**2016**
Adjusted Volume Requirement	17.08	16.95	17.40
Carryover RIN Drawdown	1.15	0.65	0.00
EPA Proposed Volume Requirement (actual/projected net RIN generation)	15.93	16.30	17.40
Carryover RIN Bank*	0.65	0.00	0.00

All numbers in billions of RINs

** Initial carryover RIN bank balance is 1.8 bil*

Moreover, treating carryover RINs as supply for purposes of the general waiver provision should be done in conjunction with the other adjustments to the volume requirements called for in this comment, lest those other adjustments be undermined by the availability of a substantial volume of carryover RINs. Doing so would of course result in still higher volume requirements.

X. ADHERING TO THE STATUTORY VOLUMES WOULD BETTER ACHIEVE THE BENEFITS CONGRESS SOUGHT

In enacting the 2007 update to the RFS, Congress sought to achieve several important policy goals. These include encouraging development of new fuels and technologies[384]; protecting the environment, in part by reducing greenhouse gas emissions[385]; stimulating job creation and economic development, especially in rural America[386]; lowering consumer prices for gasoline[387]; and boosting energy independence and security by reducing the United States' reliance on imported oil.[388]

President Obama's recent Climate Action Plan makes clear that biofuels are to be central to his environmental agenda. Echoing Congress, the Plan declares that "[b]iofuels have an important role to play in increasing our energy security, fostering rural economic development, and reducing greenhouse gas emissions from the transportation sector. That is why the

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[384] *See, e.g.*, 121 Stat. at 1492 (preamble); *American Petroleum Inst. v. EPA*, 706 F.3d 474, 475 (D.C. Cir. 2013); H.R. Rep. No. 110-306, pt. 1.

[385] *American Petroleum Inst.*, 706 F.3d at 476, 479; 121 Stat. at 1492; *NPRA*, 630 F.3d at 148; *see* 42 U.S.C. § 7545(*o*)(2)(A)(i).

[386] *See* 42 U.S.C. § 7545(*o*)(2)(B)(ii)(VI); S. Rep. No. 110-65, at 2.

[387] *See* 121 Stat. at 1492; 42 U.S.C. § 7545(*o*)(2)(B)(ii)(V).

[388] 121 Stat. at 1492; S. Rep. No. 110-65, at 1-2; *American Petroleum Inst.*, 706 F.3d at 476; *see* 42 U.S.C. § 7545(*o*)(2)(B)(ii)(II).

Administration supports the Renewable Fuel Standard, and is investing in research and development to help bring next-generation biofuels on line."[389]

Adhering to the volume requirements prescribed by Congress would better achieve Congress's and the President's policy goals than would EPA's proposal. In fact, EPA's proposal would in many respects disserve those goals, both through 2016 and afterward, when EPA would acquire reset authority.

A. The Statutory Volumes Would Continue To Encourage Critical Investment In Renewable Fuels, Whereas The Proposed Volumes Would Discourage It

EPA rightly recognizes that "spur[ring] investment in new technologies and production capacity" is "critical … if the market is going to continue expanding in future years according to Congress's intentions."[390] EPA also acknowledges that, "[i]n the longer term, sustained ambitious volume requirements are necessary to provide the certainty of a guaranteed future market that is needed by investors; the development of new technology won't occur unless there is clear profit potential, and it requires multiple years to build new production, distribution, and consumption capacity."[391] Yet the proposed rule falls far short of Congress's objective.

As detailed above, absolutely no expansion of infrastructure—and thus no investment—is needed to meet the proposed volume requirements for 2014, 2015, and, most important, 2016. The proposed volumes would be particularly damaging to the country's heartland—the center of ethanol production and a powerful antidote to imported fuel. In fact, in conjunction with the proposed advanced volume requirements, the proposed renewable fuel volume requirements would create a counterproductive scenario in which significant volumes of sugarcane ethanol are *imported* from Brazil to meet the advanced volume, while significant volumes of American corn ethanol are *exported* to meet Brazil's own demand for ethanol. This "ethanol shuffle" of course results in its own massive greenhouse gas emissions, as vast quantities of ethanol are shipped back and forth by tanker between the two countries to satisfy regulatory demands that, ironically, were designed in part to reduce the overall carbon footprint of the transportation sector.

Moreover, EPA's proposal will trigger the agency's reset power for total renewable fuel beginning in 2017. EPA appears eager to invoke that authority, thereby discarding the statutory volume requirements entirely. These actions send a strong signal to obligated parties and potential investors that infrastructure investment is likely to be unnecessary for the foreseeable future. If the statutory volume requirements can so easily be waived or discarded entirely and replaced with requirements that do little more than preserve the status quo, then investors will have little certainty regarding how much renewable fuel will be needed, and diminished economic incentive to invest in new technology. EPA's proposal would therefore destabilize the

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[389] *See* Executive Office of the President, *The President's Climate Action Plan* (June 2013), at 8, *at* https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.

[390] 80 Fed. Reg. at 33,129.

[391] *Id.* at 33,118.

market for conventional renewable fuels and chill further, essential private investment in biofuel innovation and commercialization.[392]

EPA's proposal for 2014-2016 volume requirements would be particularly damaging to the important transition from first-generation renewable fuels to second-generation fuels, especially cellulosic fuels. A commitment to conventional renewable fuel through high total volume requirements would promote the development of second-generation fuels in at least two ways: by encouraging producers of conventional renewable fuels to continue investing in second-generation fuels, and by charting a path over the ethanol blendwall.

Producers of conventional renewable fuels, including members of Growth Energy, have made enormous investments in the development of cellulosic biofuels, often in conjunction with other energy companies.[393] These companies already have spent billions of dollars building facilities and harvesting cellulosic feedstocks based on Congress's direction that volume requirements continuously increase over fifteen years. And their efforts have begun to bear fruit.[394] EPA's proposal could well halt this trend. Much of the planned growth in advanced and cellulosic biofuel production is designed around a model of licensing technology to existing biofuel producers, who are able to engage in high-value asset financing and partnering investments. But EPA's proposal to use its general waiver authority to lower conventional biofuel volume requirements below existing capacity would cripple the industry's future ability

[392] Congressional Research Service, *The Renewable Fuel Standard (RFS): Cellulosic Biofuels*, at 13 (Jan. 14, 2015) ("One source of uncertainty, particularly for investors in cellulosic biofuels ventures, concerns EPA's waiver authority. Investors may fear that the full cellulosic biofuels mandate will continually be waived to lower amounts by EPA, thus depriving them of the government-mandated market on which they had originally based their investment."), *at* http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R41106.pdf.

[393] The corn ethanol industry is critical to the development of cellulosic biofuel. *See* Ryan Fitzpatrick, *Cellulosic Ethanol is Getting a Big Boost from Corn, for Now* (Apr. 2, 2015), *at* http://thirdway.org/report/cellulosic-ethanol-is-getting-a-big-boost-from-corn-for-now (explaining "established companies with a sizable presence in the corn ethanol industry" are necessary to overcome the technological and economic challenges to scaling up cellulosic production). In fact, cellulosic projects sponsored by major corn ethanol producers (POET/DSM, Abengoa, and Quad City Corn Producers) account for more than 80% of total U.S. cellulosic capacity, and that percentage is expected to rise to 88% when a fourth major company (DuPont) opens its cellulosic facility later in 2015. *Id.*

[394] As the Congressional Research Service has found, "there were noteworthy occurrences in 2014 for the [cellulosic biofuel] industry, including the opening of three commercial-scale cellulosic ethanol plants in Iowa and Kansas with a combined production capacity of up to 52 million gallons per year." Congressional Research Service, *The Renewable Fuel Standard (RFS): Cellulosic Biofuels*, *supra* note 392 (Summary).

to make such investments.[395] Analysts at the International Council on Clean Transportation found that a waiver of the RFS would "have the indirect effect of eroding market confidence for all fuels that fall under the standard," especially for "companies that invest in second-generation fuels (cellulosic and other advanced fuels)," because "[t]hese second-generation plants rely heavily on market confidence to access and reduce the price of debt financing for plant expansions as they move to commercialize their technologies."[396]

Professor of Economics Bruce Babcock further explained the adverse effects on investments of reducing the volume requirements:

> A decision by EPA to reduce ethanol mandates in 2014 and 2015 would send a strong signal to car companies to reduce their production of flex vehicles, and to investors to not invest in high-ethanol-blend fueling stations or in next-generation plants that convert cellulosic material to ethanol. It likely also sends a negative signal to investors in biofuel plants that can convert cellulosic material to non-ethanol biofuels, such as synthetic diesel or gasoline. It might not seem that an EPA decision to decrease support for ethanol would imply a decrease in support for these "drop-in" fuels because they can be easily integrated into existing fuel channels. But the cost of constructing plants that can produce drop in fuels is high. High investment costs imply high risk. A reduction in public policy support for ethanol would only increase the perceived risk that in the future EPA would also reduce its support for other biofuels.[397]

Maintaining the statutory volume for conventional renewable fuel is also critical to breaking through the blendwall. Many next-generation cellulosic biofuels are ethanol-based and thus, like corn-based ethanol, must be blended into gasoline to be consumed. Bringing higher ethanol blends to market is thus of significant importance to ensuring growth in cellulosic ethanol. Without higher blends, incentives for bringing cellulosic ethanol brought to market would be eroded, since obligated parties are unlikely to bring higher ethanol blends to market

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395 As explained in the comment on this proposed rule submitted by POET, a modest increase in the base renewable target would strengthen the D6 RIN price accordingly, and D6 RIN prices are essential for providing the demand pull necessary for infrastructure that will enable developing *advanced* biofuels. *See* POET July 27 Comments, at 5-8; *see also* BIO Comment on EPA's Proposed 2014-2016 Standards for the Renewable Fuel Standard Program, at 32-36 (July 27, 2015) ("EPA's proposed rule will destroy incentives to invest in development of advanced and cellulosic biofuels by eliminating both incentives for new methods of compliance beyond E10 and the profits of conventional biofuel producers who are most likely to be first-adopters of the technology.").

396 Nathan Miller et al., International Council on Clean Transportation, *Measuring and Addressing Investment Risk in the Second-Generation Biofuels Industry*, at 25 (Dec. 2013), *at* http://www.theicct.org/sites/default/files/publications/ICCT_AdvancedBiofuelsInvestmentRisk_Dec2013.pdf.

397 Bruce Babcock & Wei Zhou, Impact on Corn Prices from Reduced Biofuel Mandates, Iowa State University CARD Working Paper 13-WP 543, at 10 (Nov. 2013), at http://www.card.iastate.edu/publications/dbs/pdffiles/13wp543.pdf.

voluntarily, as shown by the actions of the oil industry to date.[398] Further, under the RFS, the cellulosic volume requirement is subject to adjustment each year based on projected production.[399] The cellulosic volume requirement is therefore an unreliable mechanism for piercing the blendwall; the conventional renewable fuel volume requirement is the only reliable mechanism to exert the necessary force.

In short, the base renewable RVO provides a critical platform for the development of advanced biofuels, and undercutting conventional biofuels as EPA proposes will cripple the future of cellulosic ethanol in the United States. It is therefore critically important that EPA not undermine the best tool for incentivizing consumption of higher ethanol blends—the conventional renewable fuel requirement.

B. The Statutory Volumes Would Benefit The Environment More Than EPA's Proposed Volumes

EPA professes to be well aware that Congress intended for the RFS program to reduce greenhouse gas emissions, and to be supportive of that objective. For example, EPA observed in its prior proposed 2014 rule that one of the "central policy goals underlying the RFS program" is "reductions in greenhouse gas emissions."[400] EPA previously concluded that the RFS program would accomplish this goal by reducing greenhouse gas emissions by 4.15 billion tons over 30 years, and that "the impact of increased volumes of renewable fuel is to lower the risk of climate change."[401] In the current proposed rule, EPA emphasizes that "we do not believe that it would be consistent with the energy security and greenhouse gas reduction goals of the statute to reduce the applicable volumes of renewable fuel set forth in the statute absent a substantial justification for doing so."[402] Yet EPA proposes to do just that, and in doing so risks substantial environmental harm.

Using less ethanol in fuel, as EPA proposes, will lead to more greenhouse gas emissions. The Department of Energy has determined that, relative to petroleum gasoline, corn-based ethanol production and use reduces greenhouse gas emissions by up to 52% on a life-cycle analysis basis.[403] Similarly, researchers at the U.S. Department of Energy's Argonne National Laboratory (ANL) determined that, relative to petroleum gasoline, corn-based ethanol can reduce greenhouse gas emissions by up to 19-48% on a life-cycle analysis basis.[404] The ANL study is

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398 *See supra* pp.49-50; *supra* notes 149, 337.

399 42 U.S.C. § 7545(*o*)(7)(D)(i).

400 78 Fed Reg. at 71,778.

401 2010 RFS2 Impact Analysis, 75 Fed. Reg. at 14,798-14,799.

402 80 Fed. Reg. at 33,110.

403 *See* U.S. Dept. of Energy, Alternative Fuels Data Center, *at* http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last visited June 22, 2015).

404 Michael Wang et al., Argonne National Labs, *Well-to-Wheels energy use and greenhouse gas emissions of ethanol from corn, sugarcane, and cellulosic biomass for U.S. use*, at 9 table 7 (Dec. 13, 2012), *at* http://iopscience.iop.org/1748-9326/7/4/045905/pdf/1748-9326_7_4_045905.pdf.

noteworthy because unlike other studies, which were not harmonized with regard to methodologies and assumptions, the ANL study used a consistent modeling platform to examine greenhouse gas emissions, taking account of the full life cycle of emissions, including emissions associated with ethanol plants, fertilizer production, and corn farming.[405]

The ramifications of EPA's proposed rule for the RFS2 program overall would be significant. When it issued the RFS2 Final Rule in 2010, EPA estimated that the program would reduce greenhouse gas emissions by 138 million metric tons.[406] The current proposed rule, however, would undercut the RFS2 program by permitting the release of 6.3 million metric tons of additional greenhouse gas emissions over the 2014-2016 period when compared with Congress' intended volumes.[407] Moreover, the emissions benefits of ethanol are neither conjectural nor limited to the distant future. Analysis of 2014 data shows that current GHG emissions from corn ethanol plants range from 28% to 41% lower than emissions from gasoline plants—already lower than EPA had projected for 2022.[408]

The proposal's environmental effects would be particularly harmful with respect to cellulosic biofuels. To qualify as cellulosic biofuel, the fuel must have "lifecycle greenhouse gas emissions … at least 60 percent less than" "the average lifecycle greenhouse gas emissions … for gasoline or diesel … sold or distributed as transportation fuel in 2005."[409] The Department of Energy has determined that "[c]ellulosic ethanol use could reduce GHGs by as much as 86%."[410] But as discussed above, EPA's proposed reductions in volume requirements would impede the transition to cellulosic biofuel.

One reason that ethanol is so environmentally advantageous relative to gasoline is that corn growers have greatly improved the efficiency, minimized the local environmental impact of their operations, and adopted new technologies at ethanol facilities at a faster rate than anticipated by EPA.[411] In the last 30 years, per bushel land use has been reduced by 30 percent,

[405] *Id.* at 7-9. The ANL and other studies sometimes attribute emissions associated with "land use change" to corn ethanol production. Growth Energy does not believe that scientific evidence supports theories that "land use change" emissions are in fact associated with corn ethanol. However, for consistency with the underlying methodologies "land use change" was retained in this net emissions analysis.

[406] *See* Renewable Fuel Standard Program Regulatory Impact Analysis, EPA-420-R-10-006, Section 5.5, at 964 (Feb. 2010).

[407] Air Improvement Resource, Inc., *EPA Proposed Renewable Fuel Standards for 2014-2016: Lost Greenhouse Gas Benefits from Conventional Biofuel* (July 27, 2015) (attached as Exhibit 7).

[408] *See Emissions Reductions from Current Natural Gas Corn Ethanol Plants* (attached as Exhibit 6). Again, *see supra* note 405, "land use change" emissions were retained in this analysis solely for purposes of consistency with EPA's RFS2 analysis.

[409] 42 U.S.C. § 7545(o)(1)(C) & (E).

[410] *See* U.S. Dept. of Energy, Alternative Fuels Data Center, *at* http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last visited June 22, 2015).

[411] *Id.*

erosion by 67 percent, irrigation by 53 percent, and energy use by 43 percent.[412] Production of a barrel of hydraulically fractured oil requires nearly twice as much water as production of a barrel of ethanol.[413]

C. The Proposed Volume Requirements Would Harm The Economy, Especially In Rural Areas

So far, as Congress intended, strong growth in renewable fuels has lifted many economic boats. EPA's proposal would halt that growth and the attendant economic development.

The ethanol industry is a significant contributor to the U.S. economy, particularly in the Midwest and rural areas. In 2014, ethanol production alone accounted for approximately 11,000 direct jobs and 90,000 jobs overall, while the ethanol industry as a whole accounted for about 84,000 direct jobs and 379,000 jobs overall.[414] Ethanol production generated almost $10 billion in income and contributed about $26 billion to GDP in 2014, while the ethanol industry as a whole generated almost $27 billion in income and contributed nearly $53 billion to GDP.[415] The Department of Energy, citing an analysis by the Renewable Fuels Association (RFA), found that the economic effects in 2013 were equally substantial: "ethanol production in 2013 added more than 87,000 direct jobs across the country, $44 billion to the gross domestic product, and $30.7 billion in household income."[416]

One reason the ethanol industry has such a significant effect on the broader economy is that spending attendant to ethanol production flows through the entire economy. For example, in 2014 alone, the ethanol industry spent nearly $28 billion on raw materials, other inputs, and goods and services necessary to produce 14.2 billion gallons of ethanol.[417] The renewable fuels industry is also a catalyst for research and development, particularly with regard to developing the advanced biofuels feedstock and technology needed to meet the statutory targets for

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[412] *See* Field to Market (The Keystone Alliance for Sustainable Agriculture), *Environmental and Socioeconomic Indicators for Measuring Outcomes of On-Farm Agricultural Production in the United States*, at 10 (Dec. 2012), *at* https://www.fieldtomarket.org/report/national-2/PNT_SummaryReport_A17.pdf.

[413] *See* Growth Energy, *Oil and Water Don't Mix*, *at* http://www.growthenergy.org/news-media/blog/oil-and-water-dont-mix/ (last visited July 21, 2015).

[414] *See* John M. Urbanchuk, ABF Economics, *Contribution of the Ethanol Industry to the Economy of the United States in 2014*, at 3 (Feb. 2015), *at* http://ethanolrfa.3cdn.net/94596be2e72251b795_nkm6ii26n.pdf.

[415] *Id.* at 9, Table 2.

[416] U.S. Dept. of Energy, Alternative Fuels Data Center, *at* http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last visited July 21, 2015), citing http://www.ethanolrfa.org/page/-/rfa-association-site/Resource%20Center/2014%20Ethanol%20Industry%20Outlook.pdf?nocdn=1.

[417] Urbanchuk, *Contribution of the Ethanol Industry to the Economy of the United States in 2014*, *supra* note 414, at 4, Table 1 (Feb. 2015).

cellulosic biofuels, with estimated research and design expenditures for biofuels in the United States totaling $1.8 billion in 2014.[418]

Increased income generated through ethanol growth has important collateral benefits. For example, in 2014, the income generated through the ethanol industry yielded $4.6 billion in state and local tax revenue.[419] That tax revenue can be used to support improvements in schools, roads, and other local services, facilities, and infrastructure—benefits that are especially important for the rural areas where much of the ethanol industry is concentrated.

The proposed rule would upend the industry that makes these important contributions to the U.S. economy, and harm the farmers and others who depend upon that industry. Unlike the oil industry, which can respond nearly instantaneously to changes in supply and demand, farmers decide how much corn to plant only once a year. Based in large part on the reasonable expectation that Congress's prescribed volume requirements would apply, America's farmers have made significant long-term investments in land, equipment, and seed to produce and bring to market sufficient amounts of corn to meet the statutory volumes.[420]

The broader economic impact of the proposed rule would also be profound, particularly in rural communities. The amount of available ethanol capacity in the United States exceeds the proposed volume of conventional biofuels in 2016; as a result, a reduced mandate would result in either the idling or permanent closure currently operating facilities, or the continued idling of facilities that are not currently producing, but would be if the volume requirements were increased.[421] Idling these ethanol facilities—which are often important economic engines in rural communities—would cause a series of cascading economic effects. Plants would lose operating profits generated by the current level of production, lay off workforces, cut back or cease inputs from local vendors, and reduce their local tax payments.[422]

Specifically, a recent study found that EPA's proposal would result in the closure or continued idling of approximately 13 ethanol plants, along with the direct loss of 800 jobs at those facilities and reduced revenues from ethanol and co-product sales of $2.6 billion.[423] These

[418] *Id.* at 5.

[419] *Id.* at 11.

[420] The proposed rule is estimated to reduce corn demand by 1.3 billion bushels. *See Iowa Corn Growers Association Criticizes EPA Announcement on the Renewable Fuel Standard* (May 29, 2015), *at* http://www.iowacorn.org/index.cfm/30321/35759/iowa_corn_growers_association_criticizes_epa_announcement_on_the_renewable_fuels_standard. The USDA projects 2015/16 corn prices to average $3.75 per bushel, resulting in a $4.875 billion loss for corn growers. *See* Iowa State University, *Iowa Farm Outlook & News*, available at http://www2.econ.iastate.edu/ifo/.

[421] Edgeworth Economics, *The Impact of an RFS Waiver on the Ethanol Industry and Broader Economy in 2016*, at 1 (July 27, 2015) (attached as Exhibit 8).

[422] *Id.*at 1-2.

[423] *Id.* at 3.

economic impacts would fan through the local, primarily rural communities, ultimately resulting in the indirect loss of approximately 3,200 jobs in ethanol producing regions.[424] State and local government budgets would be harmed to the tune of approximately $31 million in lost tax revenues in regions hosting ethanol plants.[425]

D. Adhering to the Statutory Volume Requirements Would Not Appreciably Raise Retail Gasoline Prices

The proposed volume requirements could hurt American consumers at the gas pump. In fact, adhering to the volume requirements prescribed by Congress would not cause retail gasoline prices to rise appreciably, if at all, for two primary reasons. First, blending ethanol into gasoline tends to result in a significant *reduction* in retail gasoline prices. Second, as EPA itself has found, even if volume requirements caused RIN prices to increase, any such increase would have no discernible effect on retail gasoline prices.

First, focusing on potential costs from the marginal consumption of ethanol risks obscuring the massive *savings* increased ethanol consumption could provide to gasoline consumers. There is substantial evidence that blending ethanol lowers retail gas prices. One academic study found that the growth in ethanol production from January 2000 to December 2011 reduced wholesale gasoline prices by an average of 29 cents per gallon throughout the United States, in part due to the substantially increased overall volume of fuel available.[426] When crude oil prices are high, the marginal impact of ethanol can be even greater—as high as $1.09 per gallon in 2011.[427] Another analysis estimated that the RFS "cut annual consumer expenditures in 2013 between $700 billion and $2.6 trillion," which "translates to consumers paying between $0.50 and $1.50 per gallon less for gasoline."[428]

More to the point, the reduced blending of ethanol called for by EPA's proposal would cost U.S. drivers billions of dollars in 2016 alone. One recent analysis determined that reducing ethanol consumption by 1 bil gal—as EPA's proposal for 2016 would do—"will raise [gasoline prices by 4.1 cents per gallon."[429] Another study estimated that consumers saved an average of

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[424] *Id.* at 4.

[425] *Id.*

[426] Xiaodong Du & Dermot J. Hayes, *The Impact of Ethanol Production on U.S. and Regional Gasoline Markets: An Update to 2012*, Iowa State University CARD Working Paper 12-WP 528, at 5, 9 (May 2012), *at* http://www.card.iastate.edu/publications/dbs/pdffiles/12wp528.pdf.

[427] *Id.* The study found that slightly lower energy density of ethanol had virtually no effect on the overall reduction gasoline prices caused by blending in ethanol. *Id.* at 5-6.

[428] Philip K. Verleger, Jr., *Commentary: Renewable Fuels Legislation Cuts Crude Prices* (Sept. 23, 2013), *at* http://www.pkverlegerllc.com/assets/documents/130923_Commentary1.pdf.

[429] *See* Renewable Fuels Association, Economic and GHG Impacts of EPA's 2014-2016 Proposed Rule at 1, *at* http://www.ethanolrfa.org/page/-/RFA%20Impact%20of%20EPA%20Proposal_2014-2016.pdf?nocdn=1.

six cents per gallon of gasoline for every billion gallons of ethanol produced.[430] Therefore, with EIA estimating that U.S. drivers will consume 137 bil gal of gasoline in 2016, the EPA's proposal could cost consumers between $5.6 and $8.2 billion.

Second, any increase in RIN prices would not change this analysis. As EPA has found, higher RIN prices do not result in higher retail transportation fuel prices.[431] This is primarily due to the lower net cost of renewable fuels enabled by high RIN prices: "While higher RIN prices increase the cost of RFS compliance for obligated parties purchasing separated RINs, these obligated parties generally recover these costs in the price of their petroleum blendstocks."[432] Other studies have reached the same conclusion: although RIN prices can at times increase in correlation with retail gasoline prices, increased RIN prices do not *cause* an in increase in gasoline prices.[433] To the extent retail prices do increase, any movement is modest at most. One recent study found that RIN prices in the range of $0.75 to $1.50 could incentivize consumption of 1-2 billion gallons of E85, and doing so would result in an E10 price increase of only 0.5-1.3%.[434]

RIN prices have a far less significant effect on gasoline prices than the oil industry claims in part because obligated parties do not purchase all of their required RINs on the open market—far from it. Obligated parties obtain a large percentage of their RINs directly by blending renewable fuel themselves, or indirectly through preexisting contractual relationships with blenders. One study estimated that between 70 and 85 percent of the RINs attached to ethanol used in the transportation-fuel distribution chain were either directly separated by obligated parties or indirectly transferred to them under contractual arrangements.[435]

Ultimately, the claim that the RFS increases gas prices is a misleading distraction. Wholesale ethanol has historically traded well below the price of wholesale gasoline. While modest short-term investments will be needed to overcome the E10 blendwall, those one-time costs will be dwarfed by the long-term benefit to consumers, who will be able to save money on

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[430] Hassan Marzoughi & P. Lynn Kennedy, *The Impact of Ethanol Production on the U.S. Gasoline Market*, at 15 (Feb. 2012), *at* http://ageconsearch.umn.edu/bitstream/119752/2/Kennedy%20Marzoughi%20SAEA%20-%202012.pdf.

[431] *See* Report of Dallas Burkholder, Office of Transportation and Air Quality, EPA-HQ-OAR-2015-0111-0062, *A Preliminary Assessment of RIN Market Dynamics*, *RIN Prices, and Their Effects*, at 1, 31 (May 14, 2015) ("Burkholder Report"); *see also* 80 Fed. Reg. at 33,119 n.49.

[432] Burkholder Report, *supra* note 431, at 31.

[433] Informa Economics, *Analysis of Whether Higher Prices of Renewable Fuel Standard RINs Affected Gasoline Prices in 2013*, Whitepaper Prepared for the Renewable Fuels Association, at 1, 7 (Jan. 2014) ("2014 Informa Study") (attached as Exhibit 9).

[434] *See Impact on Motor Fuel Prices* at 8 (attached as Exhibit 1).

[435] *See* Informa Economics, *Retail Gasoline Price Impact of Compliance with the Renewable Fuel Standard*, Whitepaper Prepared for the Renewable Fuels Association, at 5 (Mar. 2013) (attached as Exhibit 10).

every trip to the pump by choosing higher-ethanol blends. The more ethanol in the transportation-fuel supply, the more money American drivers will save.

E. Adhering to the Statutory Volume Requirements Would Have Minimal Effect On Feed Prices And Retail Food Prices

The Congressional Budget Office (CBO) found that adhering to the statutory volumes through 2017 would raise corn prices only minimally—about $0.25 per bushel—in part because corn production would be expected to increase.[436] That small estimated increase pales in comparison to the recent precipitous *decreases* in feed prices. In 2014, farmers produced the largest corn crop in history, as 14.2 billion bushels were harvested at a record rate of 171 bushels per acre.[437] This record crop came despite farmers' harvesting 5 percent *fewer* acres than in 2013.[438] The result of such historic production is abnormally low—not high—prices. Since November 2012, feed prices have plummeted, with corn feed prices down nearly 55%.[439] In the context of such historically low prices, any minimal increase in feed prices associated with meeting the statutory volumes would be insignificant.

The statutory volumes would likewise have little impact on livestock and poultry production. Only the starch from corn is used for the production of ethanol; the entirety of the protein, and vitamins, as well as much of the residual fats derived from the corn, is used in livestock and poultry feed.[440] Further, the historic low feed prices have led to improved returns for livestock and poultry producers.[441] For example, one academic study found that much

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[436] Congressional Budget Office, *The Renewable Fuel Standard: Issues for 2014 and Beyond*, at 14 (June 2014) (hereinafter CBO, *Renewable Fuel Standard*), *at* https://www.cbo.gov/sites/default/files/45477-Biofuels2.pdf.

[437] *See Final 2014 Crop Report Shows Record Corn and Soybean Harvest*, N.Y. TIMES (Jan. 12, 2015), *at* http://www.nytimes.com/aponline/2015/01/12/business/ap-us-crop-update.html

[438] *Id.*

[439] USDA, *Feed Outlook: June 2015*, Table 3 ("Cash Feed Grain Prices") (listing November 2012 corn prices as $7.39-$8.18 and May 2015 corn prices as $3.49-$3.67; November 2012 sorghum prices as $13.10 and February 2015 as $10.70; November 2012 barley prices as $5.49-$7.23 and May 2015 as $2.76-6.23), *at* http://www.ers.usda.gov/publications/fds-feed-outlook/fds-15f.aspx. Corn prices fell nearly 35 percent from 2013 to 2014 alone. *See* Urbanchuk, *Contribution of the Ethanol Industry to the Economy of the United States in 2014*, *supra* note 414, at 4.

[440] *Don't Blame Ethanol and the RFA for High Food Prices*, WALL ST. JOURNAL, May 10, 2015, *availabl*e at http://www.wsj.com/articles/dont-blame-ethanol-and-the-rfa-for-high-food-prices-1432585106. Some corn oil is also used as a feedstock for biodiesel production, providing substantial greenhouse gas benefits in comparison to other feedstocks.

[441] Michael Jewison U.S. Dept. of Agriculture, *Outlook for Livestock and Poultry in 2015*, at 4 (Feb. 20, 2015) ("Feed costs fell to levels not seen in several years and producers responded to strong returns and increased finishing barn space by feeding hogs to record weights."), *at at* http://www.usda.gov/oce/forum/2015_Speeches/Livestock_Poultry.pdf.

cheaper feed is fueling expansion in the pork industry, and profits for 2014 were estimated at $27 per head—the most profitable year in a decade for pork producers.[442] In 2015, total livestock and poultry production is expected to expand by more than 3 percent, marking the largest year-over-year percentage increase in livestock production since 2002.[443] At most, adhering to the statutory volumes would result in a modest softening in these growing profits.

Denying an RFS waiver would also have little impact on retail food prices. Historically, as USDA Chief Economist Dr. Joseph Glauber testified to Congress, "increased biofuels production has likely had only a small effect on U.S. retail food prices."[444] Only approximately 15 percent of U.S. corn supply is used for food, and corn and food made with corn account for only a small fraction of total U.S. spending on food. As a result, the CBO concludes that adhering to the statutory volumes would increase total U.S. spending on food in 2017 only approximately one-fifth of one percent.[445]

On the other hand, EPA's proposed volume requirements would result in *higher* food prices. As explained above, reducing ethanol consumption would significantly raise fuel prices for consumers. The World Bank has found that "food prices respond strongly to … crude oil prices"; while many factors influence food prices, "[c]rude oil prices matter the most," with oil prices accounting for almost two-thirds of the food price changes from 1997 to 2012.[446] Indeed, "increases [in] petroleum prices have [approximately] twice the impact on consumer food prices as equivalent increases in corn prices."[447] Whereas "corn prices affect only a segment of consumer foods—livestock, poultry, and dairy"—"petroleum and energy prices affect *virtually all aspects* of agricultural raw material transportation, processing, and distribution of all finished consumer products."[448] As discussed above, EPA's proposal would substantially raise fuel prices for consumers. That increase in turn would raise food prices for consumers as well.

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[442] *See* National Hog Farmer, *Cheaper Feed Fuels Hog Expansion* (Jan. 7, 2014), *at* http://nationalhogfarmer.com/nutrition/cheaper-feed-fuels-hog-expansion.

[443] *See* Jewison, *Outlook for Livestock and Poultry in 2015*, *supra* note 441, at 1.

[444] Statement of Dr. Joseph Glauber, Chief Economist, U.S. Dep't of Agriculture, Before the House Comm. on Energy and Commerce, Subcomm. on Energy and Power, at 1 (June 26, 2013), *at* http://www.usda.gov/oce/newsroom/archives/testimony/2013files/ STATEMENT_OF_JOSEPH_GLAUBER_06-26-2013.PDF.

[445] Congressional Budget Office, *Renewable Fuel Standard*, *supra* note 436, at 14-15.

[446] *See* John Baffes & Allen Dennis, *Long-Term Drivers of Food Prices*, The World Bank Policy Res. Working Paper 6455 (May 2013), at 3, 14, *at* http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/05/21/000158349_20130521131725/Rendered/PDF/WPS6455.pdf.

[447] *See* John M. Urbanchuk, *The Relative Impact of Corn and Energy Prices in the Grocery Aisle*, at 4 (June 2007), *at* http://ethanolrfa.org/page/-/objects/documents/1157/food_price_analysis_-_urbanchuk.pdf?nocdn=1.

[448] *See id*. at 5.

F. The Proposed Waiver Would Impede The Nation's Path To Energy Independence

Undermining the RFS, as EPA's proposal would do, would have negative effects on the Nation's energy independence, contrary to the express goal of the EISA to "move the United States toward greater energy independence and security"—after all, its full name is the Energy Independence and Security Act.[449]

As President George W. Bush, who signed the EISA, observed:

> Part of the problem is that some of the nations we rely on for oil have unstable government, or agendas that are hostile to the United States. These countries know we need their oil, and that reduces our influence, our ability to keep the peace in some areas. And energy supply is a matter of national security.[450]

The U.S. Department of Energy has more recently stated that "[d]epending heavily on foreign petroleum supplies puts the United States at risk for trade deficits and supply disruption."[451]

The RFS plays a crucial role in cushioning the impact of price disruptions due to shocks in the price and supply of oil, by stimulating increased production and consumption of domestic renewable fuels. As was anticipated in the RFS, ethanol in particular has been critical to the United States' improved energy independence. The surge in ethanol production due to the RFS has increased the volume of domestic fuel available by about 10%, and allowed the United States to switch from a net importer of finished gasoline to a net exporter.[452] In doing so, the RFS has decreased U.S. dependence on foreign energy sources and lowered gas prices.[453] In 2005—just prior to implementation of the RFS—60% of petroleum products were imported, but this was reduced dramatically to 33% in 2013.[454] As found by the Department of Energy, petroleum imports would have been markedly higher (41%) without ethanol.[455] In fact, ethanol production

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[449] 121 Stat at 1492.

[450] Transcript of President George W. Bush, *Energy Policy & America's Dependence on Oil: Address to the Renewable Fuels Association,* WASH. POST (Apr. 25, 2006), *at* http://www.washingtonpost.com/wp-dyn/content/article/2006/04/25/AR2006042500762.html.

[451] *See* U.S. Dept. of Energy, Alternative Fuels Data Center, *at* http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last visited June 22, 2015).

[452] Urbanchuk, *Contribution of the Ethanol Industry to the Economy of the United States in 2014*, *supra* note 414, at 5.

[453] Philip K. Verleger, Jr., *RFS Kept Gas Prices Down*, The Hill, Jan. 23, 2014, *at* http://thehill.com/blogs/congress-blog/energy-environment/196135-rfs-kept-gas-prices-down.

[454] *See* U.S. Dept. of Energy, Alternative Fuels Data Center, *at* http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last visited July 21, 2015).

[455] *Id.*

accounts for 58% of the fuel supply growth between 2005 and 2011.[456] Without the RFS, there would be little competitive alternative to imported oil.

As in other areas, EPA merely pays lip service to its statutory obligations. It observes, "By aiming to diversify the country's fuel supply, Congress also intended to increase the Nation's energy security."[457] But, as explained above, EPA's proposal would in effect maintain current levels of production and consumption of ethanol-based renewable fuels and therefore would fail to advance the goal of ensuring the Nation's energy independence and security.

The recent increase in domestic oil production has not changed this fundamental dynamic. Despite significant increases in domestic oil production, the United States still imports more than 9 million barrels per day of foreign oil,[458] and the price of oil has also once again begun rising.[459] The only effective strategy for improving the United States' energy security is to reduce our dependence on oil by stimulating further growth in renewable fuels. But decreasing the volume requirements for domestic renewable fuels in the U.S. market, as EPA proposes, would fail to achieve this goal. In short, the RFS "set a goal to replace oil from around the world. The best way and the fastest way to do so is to expand the use of ethanol."[460]

XI. CONCLUSION

For the reasons set forth above, EPA should not grant a general waiver and should not reduce the statutory renewable fuel volume requirements further than the proposed cellulosic waiver flow-through would allow. Specifically, EPA should set the renewable fuel volume requirement to 17.08 bil for 2014, 17.90 for 2015, and 18.40 for 2016. At a minimum, though, EPA should raise its proposed renewable fuel volume requirements to account for the higher projected E10 blendwall, the correct treatment of exported ethanol, and the proper treatment of carryover RINs as supply for purposes of the general waiver authority. Unless EPA takes these actions, EPA's 2014-2016 RFS rule will fail to spur any of the growth in renewable fuel production and use that Congress sought to achieve through the RFS.

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[456] *Id.* at 9.

[457] 80 Fed. Reg. at 33,101.

[458] *See* EIA, *Weekly U.S. Imports of Crude Oil and Petroleum Products* (showing an average of 9,105,000 barrels of oil imported per day thus far in 2015), *at* http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=WTTIMUS2&f=W.

[459] *See* EIA, *Weekly Cushing, OK WTI Spot Price FOB* (showing a price increase of 23 percent from January to May 2015), available at http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=W.

[460] Bush, *supra* note 450.

Exhibit List

Growth Energy Comments on EPA's Proposed Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017

Docket # EPA–HQ–OAR–2015-0111

Exhibit Number	Title of Exhibit
1	Edgeworth Economics, *Impact of the RFS Mandate on Motor Fuel Volumes and Prices, 2014—2016* (July 27, 2015)
2	Stratas Advisors, *Non-Ethanol Potential for RFS Compliance* (July 16, 2015)
3	Air Improvement Resources, *Analysis of Fleet Percentage of 2001+ Model Year Group In Calendar Years 2014, 2015, and 2016* (July 27, 2015)
4	Stillwater Associates, *Infrastructure Changes and Cost to Increase RFS Ethanol Volumes through Increased E15 and E85 Sales in 2016* (July 27, 2015)
5	Letter from Patrick Jeitler, Dispenser Project Manager—North America, Wayne (Jan. 14, 2014)
6	Air Improvement Resources, Inc., *Emissions Reductions from Current Natural Gas Corn Ethanol Plants* (July 27, 2015)
7	Air Improvement Resources, Inc., *EPA Proposed Renewable Fuel Standards for 2014—2016: Lost Greenhouse Gas Benefits from Conventional Biofuel* (July 27, 2015)
8	Edgeworth Economics, *The Impact of an RFS Waiver on the Ethanol Industry and Broader Economy in 2016* (July 27, 2015)
9	Informa Economics, *Analysis of Whether Higher Prices of Renewable Fuel Standard RINs Affected Gasoline Prices in 2013*, Whitepaper Prepared for the Renewable Fuels Association (Jan. 2014)
10	Informa Economics, *Retail Gasoline Price Impact of Compliance with the Renewable Fuel Standard*, Whitepaper Prepared for the Renewable Fuels Association (Mar. 25, 2013)

Exhibit 1

IMPACT OF THE RFS MANDATE ON MOTOR FUEL VOLUMES AND PRICES, 2014 – 2016

Edgeworth Economics

July 27, 2015

Edgeworth Economics adapted the model of motor fuels markets developed in the September 2014 working paper, "Impact of Ethanol Mandates on Fuel Prices when Ethanol and Gasoline are Imperfect Substitutes," by Sébastien Pouliot and Bruce A. Babcock ("P&B 2014").[1] The purpose of the model is to evaluate the impact of various levels of the RFS biofuels mandate on the prices and quantities of motor fuels consumed and exported. Edgeworth updated the parameters of the P&B 2014 model to reflect conditions for fuels markets in 2014-2016. This memo describes the assumptions (where differing from those described in P&B 2014) and the key results.

P&B 2014 describes an open-economy, partial equilibrium model of supply and demand for ethanol, gasoline, and final motor fuels, namely E10 and E85. The model is based on an assumption that E10 and E85 are imperfect substitutes, with RFS compliance for conventional ethanol requirements above the blendwall met either by switching from E10 to additional E85 or the export of gasoline.[2] P&B calibrate their model for 2013, based on data available as of 2014. A key assumption is the shape of the demand curve for E85, which P&B adopt from their earlier research based on the location of FFVs and gas stations that offer E85. P&B assume modest E85 demand when the price of E85 is above the price of E10 (on an energy-adjusted basis), with demand increasing as E85 price nears and surpasses parity, and ultimately reaching a limit of about 1.25 billion gallons. P&B derive this relationship based on a number of important assumptions, including a limit on gas station throughput of 45,000 gallons per month.[3] Note, the model does not account for the existence of banked RINs; therefore compliance with the mandate must be achieved in each year solely through increased biofuel use.[4]

Using this model, P&B simulate mandate levels ranging from non-binding (*i.e.*, below the blendwall) up to a maximum after which no further E85 can be procured. P&B conclude that RIN prices on the order of $1 to $2 would be sufficient to expand E85 consumption up to the technical limit imposed on the model (approximately 1.25 billion gallons). P&B find that the value of the RINs would manifest as a discount for wholesale ethanol, resulting in E85 prices declining significantly and very little increase in the retail price of E10 (less than 1 percent from baseline levels). P&B conclude that a mandate of about 14.1 billion gallons of conventional ethanol would have been feasible in 2013, and would have resulted in RIN prices within the

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[1] P&B 2014 was available at the time of this writing at the website of the Center for Agriculture and Rural Development, Iowa State University ("CARD"): www.card.iastate.edu/publications/synopsis.aspx?id=1228.

[2] P&B assume E10 contains 10 percent ethanol and E85 contains 75 percent ethanol.

[3] A recent analysis by Stillwater Associates confirms that a maximum throughput of 45,000 gallons per month is a reasonable and feasible, if conservative, assumption based on existing infrastructure. ["Infrastructure Changes and Cost to Increase RFS Ethanol Volumes through Increased E15 and E85 Sales in 2016," prepared for Growth Energy by Stillwater Associates LLC, July 2015]

[4] P&B address only the impact of D6 (conventional corn-based ethanol) RINs as an incentive for increased biofuel use. They do not consider the various forms of "advanced" biofuels in their model. This approach essentially treats the difference between the total mandated biofuel quantity and the mandate for "advanced" biofuels as a separate mandate for conventional ethanol. This approach is reasonable when consumption quantities would match mandated volumes in the absence of a standard. To the extent that there is additional production of other biofuels above mandated levels, particularly other forms of ethanol, that could increase the overall availability of ethanol and lower the market price for that type of fuel, leading to greater consumption of E85 than predicted by this model. Such impacts are likely to be small, relative to the other market-based effects measured here.

range of values actually experienced historically with only modest impacts on overall consumer and producer welfare (less than $200 million annually).

To calibrate the P&B 2014 model for 2014 through 2016, we updated the authors' assumptions (described in Table 1 of P&B 2014) using actual data for 2014 and projections for 2015 and 2016 from the same sources, primarily EIA's *Annual Energy Outlook* (2015 edition).[5] Two key aspects of the model require additional explanation. B&P 2014 do not report generalizable formulas for ethanol supply or E85 demand. For ethanol supply, we assume P&B's functional form at a corn yield of 170 bushels/acre, which is close to the most recent projections for the 2014/2015 and 2015/2016 crop years of 171 bushels/acre and 167 bushels/acre, respectively (USDA, *Grains and Oilseeds Outlook*, February 20, 2015).[6] For E85 demand, we adopt P&B's demand curve; however, we assume an expansion of potential E85 consumption at each price point proportional to the increase in the number of E85 stations going forward from 2013. We assume no additional increase related to FFV fleet size. This approach is somewhat conservative, but generally consistent with other research by P&B.[7] Based on data from DOE's Alternative Fuels Data Center regarding E85 stations, we assume an increase in potential E85 demand at every price point of 15.6 percent from P&B's 2013 values to 2014, 32.9 percent from 2013 to 2015, and 52.9 percent from 2013 to 2016.[8] We retain other assumptions adopted by P&B related to, for example, elasticity of demand for retail gasoline and export elasticity.

The key results at mandate levels higher than the blendwall are the changes in E10/E85 consumption and gasoline exports relative to the baseline quantities (*i.e.*, relative to a scenario with the mandate set below the blendwall), as well as the changes in E10/E85/RIN prices. For comparison, we have reproduced P&B's results for 2013 from P&B 2014 in Table 1. Quantities and prices (except for RIN price) are presented in terms of changes relative to the baseline. As shown here, P&B found that for 2013 a mandate set about 0.5 billion gallons above the blendwall[9] would have resulted in a RIN price of about $1.51[10], corresponding to a discount for E85 of about 34 percent off baseline levels. E85 consumption would have risen above baseline levels by about 0.7 billion gallons (the maximum amount of additional E85 that could be delivered and consumed in 2013, based on P&B's assumptions), with only small adjustments in gasoline exports and E10 prices.[11]

[5] P&B rely on U.S. International Trade Commission (ITC) data for two assumptions: wholesale gasoline price and net exports of gasoline. This source does not provide projections. We therefore use EIA figures for wholesale gasoline price and assume no change in gasoline exports for 2015 and 2016, relative to 2014 values as reported by the ITC.
[6] This assumption essentially implies that ethanol capacity in 2015 or 2016 will not expand from present values. To the extent ethanol capacity does increase, RFS compliance costs would be lower than measured here.
[7] See, for example, Bruce A. Babcock and Sébastien Pouliot, "Impact of Sales Constraints and Entry on E85 Demand," CARD Policy Brief 13-PB 12, August 2013.
[8] AFDC reported 2,784 stations at the end of 2014, compared to 2,409 at the end of 2013 (15.6 percent increase). AFDC reported an additional increase of 7.3 percent from 2014 through mid-2015. [www.afdc.energy.gov/data_download] We assume a total year-over-year increase of 15.0 percent for each of 2015 and 2016.
[9] Based on the EPA's approach in the NPRM, we calculate the 2013 blendwall to be approximately 13.5 billion gallons. The model results are not particularly sensitive to small differences in total gasoline consumption.
[10] Based on the assumptions adopted in this approach, the model necessarily finds a RIN price of zero when the mandate is set below the blendwall, defined as 10 percent of total motor gasoline consumption. Historically, RIN prices have exceeded zero at times when the mandates have been set at levels below the blendwall, due to real-world complications including a small, residual demand for E0, the forward-looking nature of the RIN market, and uncertainty regarding EPA's intentions for both future and retroactive policy changes.
[11] Our results differ slightly from P&B 2014 due to our approximation of P&B's E85 demand curve and ethanol supply curve formulas.

Table 1
Model Solutions for 2013

Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.07	+0.12		+0.0%	-3.1%	0.14
+0.2	+0.0	-0.12	+0.26		+0.0%	-6.8%	0.31
+0.3	+0.1	-0.20	+0.40		+0.1%	-11.0%	0.50
+0.4	+0.2	-0.31	+0.54		+0.2%	-17.0%	0.77
+0.5	+0.3	-0.46	+0.68		+0.3%	-33.7%	1.51

Tables 2a-2c show results for 2014, 2015, and 2016 based on our implementation of the P&B model with the additional assumptions described above. For each table, quantities and prices are again presented in terms of changes relative to the baseline, with adjustments shown up to the point where the E85 volumes reach the maximum level that could be delivered and consumed in that year given P&B's assumptions, updated to reflect current projections as discussed above, including the 45,000 gallon-per-month throughput limit per station.

Results for each of these years show qualitatively similar results to those found by P&B for 2013. For 2014, a mandate set at about 0.5 billion gallons above the blendwall[12] would have resulted in an increase of E85 consumption by about 0.6 billion gallons above baseline levels, with RIN prices at about $0.87.

For 2015, a mandate set at about 0.7 billion gallons above the blendwall[13] would result in an increase of E85 consumption by about 0.9 billion gallons above baseline levels, with RIN prices at about $0.93.

For 2016, a mandate set at about 1.2 billion gallons above the blendwall[14] would result in an increase of E85 consumption by about 1.6 billion gallons above baseline levels, with RIN prices at about $2.02.

[12] Based on the EPA's approach in the NPRM and current data from EIA (July 2015 STEO), we calculate the 2014 blendwall to be approximately 13.64 billion gallons.
[13] Based on the EPA's approach in the NPRM and current data from EIA (July 2015 STEO), we calculate the 2015 blendwall to be approximately 13.90 billion gallons.
[14] Based on the EPA's approach in the NPRM and current data from EIA (July 2015 STEO), we calculate the 2016 blendwall to be approximately 13.84 billion gallons.

Table 2a
Model Solutions for 2014

Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.01	+0.02		0.0%	-0.5%	0.02
+0.2	+0.0	-0.06	+0.16		0.1%	-3.9%	0.16
+0.3	+0.0	-0.12	+0.30		0.1%	-7.7%	0.32
+0.4	+0.1	-0.19	+0.43		0.2%	-12.7%	0.53
+0.5	+0.1	-0.30	+0.57		0.3%	-21.0%	0.87

Table 2b
Model Solutions for 2015

Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.04	+0.09		0.0%	-3.6%	0.14
+0.2	+0.0	-0.08	+0.22		0.1%	-7.9%	0.30
+0.3	+0.0	-0.15	+0.36		0.2%	-11.4%	0.44
+0.4	+0.0	-0.16	+0.50		0.2%	-14.6%	0.56
+0.5	+0.0	-0.20	+0.63		0.3%	-17.6%	0.68
+0.6	+0.0	-0.25	+0.77		0.4%	-20.7%	0.80
+0.7	+0.0	-0.28	+0.90		0.4%	-24.0%	0.93

Table 2c
Model Solutions for 2016

Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.01	+0.02		0.0%	-0.7%	0.03
+0.2	+0.0	-0.03	+0.16		0.0%	-5.0%	0.20
+0.3	+0.0	-0.08	+0.30		0.0%	-8.4%	0.33
+0.4	+0.0	-0.12	+0.44		0.1%	-11.3%	0.45
+0.5	+0.0	-0.16	+0.58		0.2%	-14.0%	0.56
+0.6	+0.0	-0.19	+0.72		0.2%	-16.6%	0.66
+0.7	+0.0	-0.23	+0.86		0.3%	-19.4%	0.77
+0.8	+0.0	-0.28	+1.00		0.4%	-22.3%	0.89
+0.9	+0.0	-0.32	+1.14		0.5%	-25.8%	1.03
+1.0	+0.0	-0.37	+1.28		0.6%	-30.2%	1.20
+1.1	+0.1	-0.46	+1.42		0.8%	-36.6%	1.45
+1.2	+0.1	-0.58	+1.56		1.1%	-51.9%	2.02

We prepared a second set of scenarios using an alternate assumption regarding E85 throughput evaluated by P&B in previous published work—specifically, a maximum throughput of 90,000 gallons per month per E85 station, rather than 45,000.[15] Tables 3a-3c show results for 2014, 2015, and 2016. As expected, E85 consumption is substantially higher at comparable RIN prices. For 2014, a mandate set at about 1.2 billion gallons above the blendwall would have resulted in an increase of E85 consumption by about 1.6 billion gallons above baseline levels, with RIN prices at about $1.99. For 2015, a mandate set at about 1.8 billion gallons above the blendwall would result in an increase of E85 consumption by about 2.4 billion gallons above baseline levels, with RIN prices at about $1.90. For 2016, a mandate set at about 1.7 billion gallons above the blendwall would result in an increase of E85 consumption by about 2.4 billion gallons above baseline levels, with RIN prices at about $1.48.

[15] See, for example, Babcock & Pouliot, "Impact of Sales Constraints and Entry on E85 Demand," CARD Policy Brief 13-PB 12, August 2013. A recent analysis by Stillwater Associates confirms that a maximum throughput of 90,000 gallons per month is a reasonable and feasible, if conservative, assumption based on existing infrastructure with modest expansions. ["Infrastructure Changes and Cost to Increase RFS Ethanol Volumes through Increased E15 and E85 Sales in 2016," prepared for Growth Energy by Stillwater Associates LLC, July 2015]

Table 3a
Model Solutions for 2014, 90,000 Gallon Throughput Limit

Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.01	+0.06		+0.0%	-0.9%	0.04
+0.2	+0.0	-0.04	+0.20		+0.0%	-3.1%	0.14
+0.3	+0.0	-0.08	+0.34		+0.0%	-5.2%	0.23
+0.4	+0.0	-0.11	+0.47		+0.1%	-7.2%	0.32
+0.5	+0.0	-0.16	+0.61		+0.2%	-9.2%	0.41
+0.6	+0.0	-0.19	+0.75		+0.2%	-11.4%	0.50
+0.7	+0.0	-0.23	+0.89		+0.3%	-13.7%	0.61
+0.8	+0.0	-0.28	+1.03		+0.4%	-16.4%	0.72
+0.9	+0.0	-0.33	+1.16		+0.4%	-19.5%	0.86
+1.0	+0.0	-0.38	+1.30		+0.5%	-23.7%	1.03
+1.1	+0.1	-0.48	+1.44		+0.7%	-30.0%	1.29
+1.2	+0.2	-0.63	+1.57		+1.0%	-47.1%	1.99

Table 3b
Model Solutions for 2015, 90,000 Gallon Throughput Limit

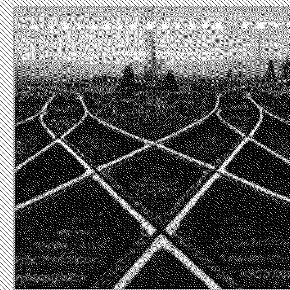
Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.02	+0.05		0.0%	-1.7%	0.06
+0.2	+0.0	-0.07	+0.18		0.1%	-5.9%	0.22
+0.3	+0.0	-0.13	+0.32		0.2%	-9.0%	0.34
+0.4	+0.0	-0.14	+0.45		0.2%	-11.7%	0.46
+0.5	+0.0	-0.19	+0.59		0.3%	-14.0%	0.55
+0.6	+0.0	-0.21	+0.73		0.3%	-16.1%	0.63
+0.7	+0.0	-0.27	+0.86		0.5%	-18.0%	0.71
+0.8	+0.0	-0.30	+1.00		0.5%	-19.9%	0.79
+0.9	+0.0	-0.34	+1.13		0.6%	-21.7%	0.87
+1.0	+0.0	-0.35	+1.27		0.6%	-23.7%	0.94
+1.1	+0.0	-0.40	+1.41		0.7%	-25.6%	1.02
+1.2	+0.0	-0.42	+1.54		0.8%	-27.6%	1.11
+1.3	+0.0	-0.46	+1.68		0.9%	-29.7%	1.19
+1.4	+0.0	-0.50	+1.81		1.0%	-32.0%	1.29
+1.5	+0.0	-0.55	+1.95		1.1%	-34.6%	1.39
+1.6	+0.0	-0.60	+2.08		1.2%	-37.8%	1.51
+1.7	+0.0	-0.66	+2.22		1.4%	-41.9%	1.67
+1.8	+0.1	-0.76	+2.35		1.7%	-47.9%	1.90

Table 3c
Model Solutions for 2016, 90,000 Gallon Throughput Limit

Volumes – Change from Baseline (billion gallons)					Prices - % Change from Baseline		
Mandate (compared to blendwall)	Gasoline Exports	E10	E85		E10	E85	RIN Price ($)
+0.1	+0.0	-0.04	+0.11		+0.0%	-3.2%	0.12
+0.2	+0.0	-0.06	+0.25		+0.0%	-6.4%	0.26
+0.3	+0.0	-0.10	+0.39		+0.1%	-8.9%	0.36
+0.4	+0.0	-0.13	+0.53		+0.1%	-11.1%	0.45
+0.5	+0.0	-0.19	+0.67		+0.3%	-13.0%	0.53
+0.6	+0.0	-0.22	+0.81		+0.3%	-14.8%	0.61
+0.7	+0.0	-0.23	+0.95		+0.3%	-16.6%	0.68
+0.8	+0.0	-0.29	+1.09		+0.5%	-18.2%	0.75
+0.9	+0.0	-0.30	+1.23		+0.5%	-19.9%	0.82
+1.0	+0.0	-0.33	+1.37		+0.6%	-21.6%	0.89
+1.1	+0.0	-0.37	+1.51		+0.6%	-23.2%	0.96
+1.2	+0.0	-0.43	+1.65		+0.8%	-24.8%	1.03
+1.3	+0.0	-0.47	+1.79		+0.9%	-26.6%	1.11
+1.4	+0.0	-0.48	+1.93		+0.9%	-28.6%	1.19
+1.5	+0.0	-0.53	+2.07		+1.0%	-30.7%	1.28
+1.6	+0.0	-0.57	+2.21		+1.1%	-33.0%	1.37
+1.7	+0.0	-0.65	+2.35		+1.3%	-35.7%	1.48

Exhibit 2



STRATAS ADVISORS

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Non-Ethanol Potential for RFS Compliance

July 16, 2015

UPSTREAM | MIDSTREAM | DOWNSTREAM | FUEL & TRANSPORT

Table of Contents

Introduction 3
Biodiesel Production 4
Renewable Diesel Production 8
Biodiesel Imports 9
Renewable Diesel Imports 10
Biodiesel Consumption 11
Renewable Diesel Consumption 14
Summary 15
Discussion 16
Notes and References 16

Introduction

In recent Renewable Fuel Standard (RFS) annual rulemaking proposals, the Environmental Protection Agency (EPA) has highlighted the different constraints on achieving expanding use of ethanol vs. other renewable fuels for compliance by obligated parties. Non-ethanol biofuels have begun to fill gaps in the mandates, and their growing importance to RFS compliance is in shown by their domination of compliance credit (called Renewable Identification Numbers or RINs) pricing in 2013 and 2014. The EPA's most recent proposal requests comment on the volumes proposed and the possible methods for achieving compliance from expansion of the volume requirement over previous years. EPA discussions on potential scenarios often involve a significant increase in qualifying non-ethanol biofuels usage. As a contribution to this discussion, we present research into developing specific upper boundary scenarios for RIN-generating, non-ethanol renewable fuels usage in the U.S. for compliance in 2016. Though the EPA must consider many variables, there has been a focus in EPA's discussions on supply and limitations on consumption, and this paper focuses on these issues.

EPA discusses their expectations that RINs prices will increase to increase biofuels production, importation and consumption. Since the exercise is to establish an upper boundary based on production and consumption limits only, price feedback and feedstock limitations will not be examined in these comments. Also, the type of RINs (RINs code) will not be tracked, though we note that a substantial increase in non-ethanol renewable fuel usage over historical levels would result in an increase in the portion of D6 RINs generated from these fuels as additional volumes would come from grandfathered biodiesel and renewable diesel.

We examine 4 scenarios for maximum RINS generation from non-ethanol renewable fuels:

EPA Historical Annual Maximum: This scenario adds the maximum yearly RINs generated by each fuel type according to historical EPA data, as well as maximum consumption. This is a conservative, highly durable scenario which builds from proven RINs generation over the length of variable yearly conditions that has expectations to be repeatable with previous annual levels of market incentives.

EIA Historical Annualized Peak Data: This scenario builds on historical Energy Information Administration (EIA) monthly production, import, and consumption rates of physical products, where possible. This scenario looks for peak historical EIA production and import rates data for biofuels to establish proven maximum capabilities, and translates these volumes into potential for annual RINs generation. This is a strongly defensible upper boundary, which requires RFS mandates to place incentives to the system similar to those seen at these historical peaks. The EPA uses EIA energy data in its RFS rule making. Maximum consumption rates are from EIA Peak data or developed from the available EPA data.

Base Case Scenario: This scenario differed from the first two only in the modelling of domestic production of RINs- generating biofuels. Production in this scenario maximizes the utility of existing, operational domestic production capability based on EIA or EPA information. This production modelling is similar to that performed by the EPA in establishing previous RFS standards, using the same data sources (primarily EIA), but with attempts to establish an upper boundary to production. This scenario uses the import volumes from the EIA or EPA scenarios. Maximum consumption rates are from EIA Peak data scenario. In summary, our analysis for biodiesel shows a maximum U.S. production of 3,253 million RINs and coupled with imports of 748 million RINs the maximum RINs generated would be 3,599 million. Our analysis for renewable diesel shows a maximum U.S. production of 255 million RINs and coupled with imports of 742 million RINs the maximum RINs generated would be 997 million.

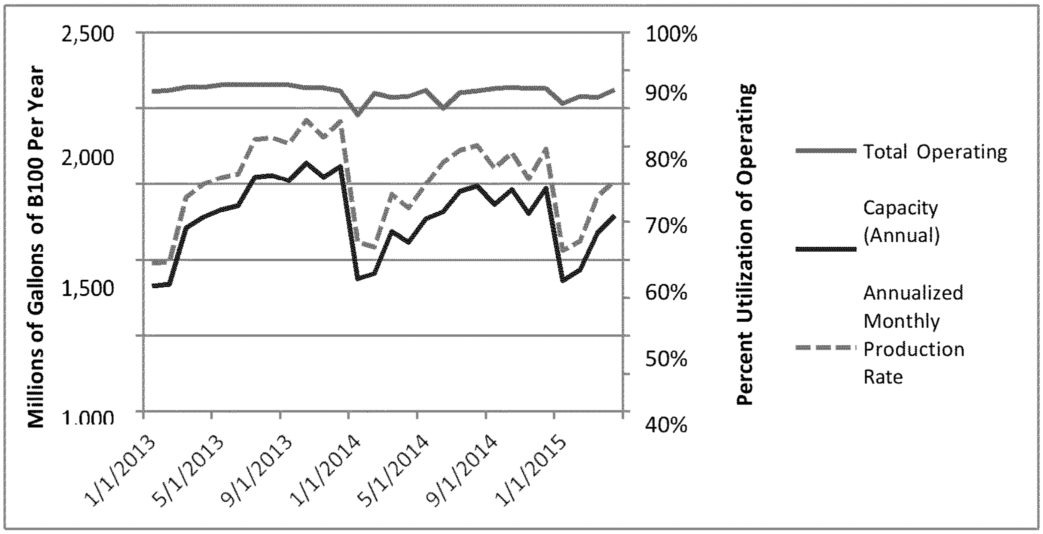
Maximum Capacity Scenario: This compiles a maximum for physical biofuels p roduction using historical production capacities and potential production from capacity data established by the EPA or EIA, only using other sources where data is missing. EPA often discusses potential production maximums with these capacities. This scenario also uses the import volumes from the EIA or EPA scenarios. The consumption limits are also maximized using the next-most binding limit past the EIA or EPA scenarios (primarily moving from 4.3% EIA peaks to 5% biodiesel blending in diesel). In summary, our analysis for biodiesel shows a maximum production of 4,140 million RINs and coupled with imports of 748 million RINs the maximum RINs generated would be 4,091 million. Our analysis for renewable diesel shows a maximum U.S. production of 362 million RINs and coupled with imports of 1,662 million RINs the maximum RINs generated would be 2,024 million.

Biodiesel Production

EIA has a monthly biodiesel production survey which will serve as the basis for our discussion of U.S. biodiesel production and capacity. The EIA survey, which is mandated, produces the most conservative dataset available and is used by the EPA for discussing known capacity. In the current EIA biodiesel survey report (produced in June 2015 featuring data from April 2015), the operating U.S. biodiesel capacity was 2,125 million wet gallons per year, and the monthly production rate translated to an annualized average of 1,298 wet million gallons per year.[1] Production rates have shown a great response to wide swings in seasonal demand (both weather-related and regulation-calendar artifice) and market incentives (changing RFS demand information, changing availability of the $1 per gallon blender's tax credit) in the years covered by the survey. Monthly production rates changed over 50% in 2013, the first year total RFS demand placed strain on the RINs market. However, operating production capacity has not been as responsive (see chart below), varying less than 10% over the same period. The EIA historical peak biodiesel monthly U.S. production rate translates to 1,649 million wet gallons per year or 2,474 RINs.[2] The EPA's 2013 EMTS data shows 2,076 as the maximum annual total RINs from biodiesel.[3]

[1] EIA Biodiesel Monthly Production Report, June 2015 (featuring data current as of April 2015)
[2] Ibid
[3] EPA 2013 RINs Supply Docket EPA-HQ-OAR-2015-0111-0003

U.S. Operating Biodiesel Capacity and Production Rates



Source: EIA Monthly Biodiesel Production Report, June 2015, Stratas Advisors

The EIA biodiesel survey data shows a very consistent operating U.S. production capacity, averaging 2,110 million wet gallons of operating capacity with less than 10% variance over three years even though monthly production swings changed over 40% during the course of a year. However, the same survey data shows that total annual demand for biodiesel (as seen by total production) varied only 6.5% from 2013 to 2014. Based only on the EIA biodiesel survey data and trends shown, modelling operational capacity variance in response to a 2016 RFS rule is not possible, consequently current EIA average biodiesel operating production capacity will be used for our base case scenario.

However, an extreme increase in RFS demand would certainly be expected to bring some idled capacity on-line (or incentivize registration of operating capacity un-registered with the RFS) on-line to generate RINs in a maximum scenario. Multiple databases and the EPA's own data show potential for additional operational capacity. The EPA states that a total of 2.8 billion wet gallons of capacity is available[4], while Biodiesel Magazine's database lists 2.79 billion wet gallons of existing biodiesel capacity in its update on July 2, 2015. The most potential additional RINs-generating capacity comes from the non-operating capacity registered with the RFS, which can quickly begin production and RINs generation. In the RFS proposal, the EPA lists 2,760 million wet gallons of capacity registered and 2,403 million wet gallons of that capacity operating in 2012.[5] Against recent operation capacity averages, it implies nearly 300 million wet gallons of RFS-registered capacity was idled since 2012 (making it relatively more likely for the plant to be

[4] EPA Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-based Diesel Volume for 2017 page 37.
[5] Ibid.

ED000569_003756

brought back on-line) and that an additional 350 million wet gallons of capacity was registered but not producing in 2012 (that we believe would be relatively less likely to be brought on-line). While this lets us set maximum scenario operating capacities at 2.4 billion to 2.8 billion wet gallons, the available biodiesel data does not allow for specifically modelling biodiesel plant re-start and/or RFS registration rates, so the potential increases in operational operating biodiesel production capacity are not included in the base case maximum scenario.

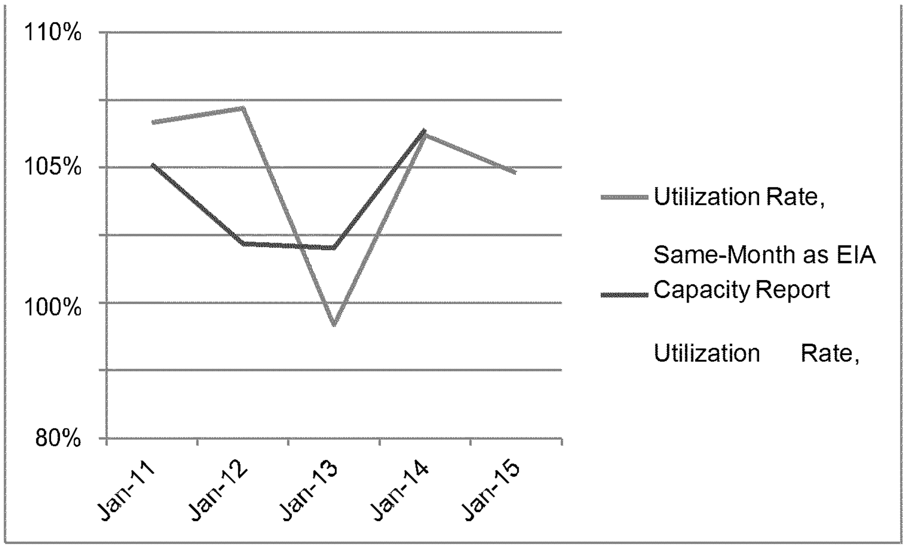
In addition, EIA data does show that operating ethanol plant capacity has recovered by 7.8% in one year, from January of 2014 to January of 2015[6], as ethanol plants recovered from high corn prices and responded to increasing export demand. So biofuel plants have historical precedent for restarts, and the EPA has acknowledged that they expect restarts to occur based on increased market demand.[7] While not used as a source in developing these scenarios, the recently updated Biodiesel Magazine database implies a much higher operational capacity and supports the upper boundary capacity given by the EPA and used in the maximumscenario.

Modelling maximum operating capacity utilization rates can be supported by EIA data. Annual biodiesel plant capacity utilization has historically been below operating nameplate, an average of 63.5% for 2013 and 60.7% for 2014 as seen within EIA monthly biodiesel production report data[8], with 41% calculated for 2012 derived using other EIA data.[9,10] Ethanol plants have also shown annual utilization shifts of 15% in recent years, primarily recovering primarily from poor export environments (see figure below). According to EIA data, peak monthly utilization of operating capacity has reached 77% (see figure above). Since monthly biodiesel plant utilization has shown response to market conditions by nearly 40%, further expansion beyond past peak utilization toward 100% capacity run rates is not an unreasonable assumption for the base case maximum scenario where biodiesel production will be incentivized by the RFS at least as much as ethanol production was by all factors in recent years.

In fact, ethanol plants, with capacity registered under the same engineering review scrutiny as biodiesel plants, have exceeded total nameplate capacity in many instances. The EIA has shown a potential 4.3 to 4.5% annual yields above nameplate capacity for ethanol plants under maximum-run conditions in their annual surveys,[11] and the EIA data shows that in 2014, annual ethanol utilization recovered to 2.8% over the nameplate capacity reported by EIA in January of 2014.[12] With consideration of this EIA data, we can place a maximum utilization rate of operational capacity in 2016 at 102.8% in our base case and maximum scenarios.

[6] EIA U.S. Fuel Ethanol Plant Production Capacity reports 2011-2015
[7] "In reviewing biodiesel production over time, it is clear that wide swings in production can occur extremely rapidly. Thus, increasing production at plants currently operating is entirely feasible, with the main issues limited to purchase and transport logistics for the increased volumes of feedstock. Meanwhile, a portion of the large amount of idle capacity could also be brought online once operators receive the signal that will be provided by publication of this final rulemaking. Biodiesel plants have the ability to restart rapidly as evidenced by the long history of facilities shutting down temporarily and then starting back up again when economic conditions improve." -EPA: Renewable Fuel Standard Program Summary and Analysis of Comments 3-189.
[8] EIA Biodiesel Monthly Production Report, June 2015
[9] EIA Total Energy Review Table 10.4
[10] List of Biodiesel Plants in the U.S. Docket EPA-HQ-OAR-2015-0111-0007
[11] U.S. Fuel Ethanol Plant Production Capacity report, 2011, 2012
[12] EIA: Total Energy Table 10.3

Ethanol Production Capacity Utilization Rates



Ethanol operating capacity is reported only for January 1 of each year, starting in 2011, and not monthly, as biodiesel capacity has been since 2013. The comparison shown above is utilization rates for the month of January and the full year, using EIA annual January ethanol production data and EIA total annual production. January ethanol production data would be assumed to provide the most precise utilization rates, but annual production might remove any seasonal or event-specific signals.

Source: EIA: U.S. Fuel Ethanol Plant Production Capacity reports, EIA: Total Energy Table 10.3, Stratas Advisors

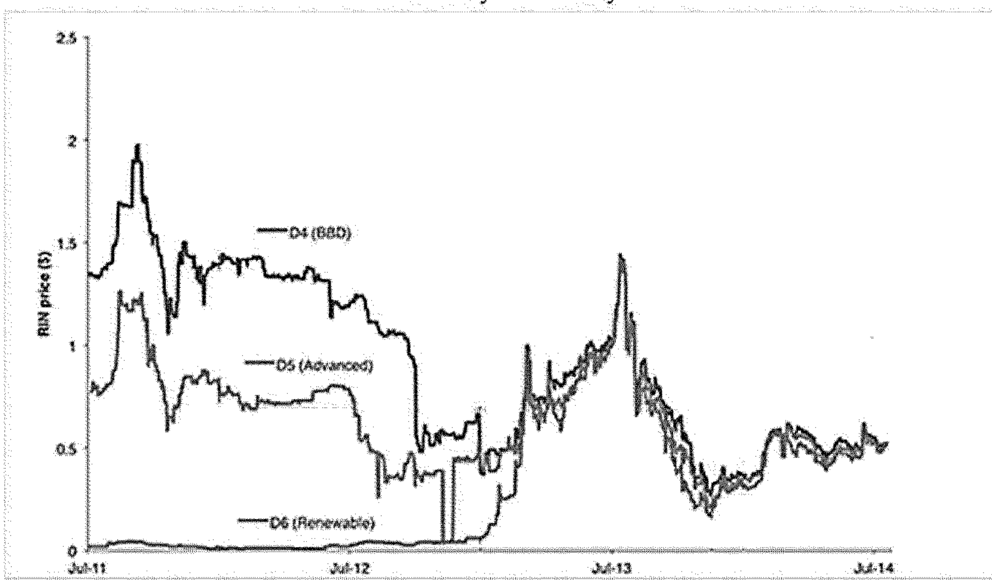
These comments do not discuss feedstock or pricing constraints to increased biofuels production, noted that the EPA shows that over 100 domestic and foreign biodiesel plants are "grandfathered" to allow production and RINs generation from a wider source of feedstocks, with palm oil the most significantly available alternative source. In the 2013/2014 season, global palm oil production (59.4 million mts.) was 28% larger than global soybean oil production (45.0 million mts.)[13] The RINs generated using palm oil in a grandfathered facility would be D6 rather than D4. As seen in the EPA's proposal (see figure below), the market recognized the interchangeable value of these RINs types toward compliance in tight market conditions driven by the RFS during 2013 and 2014. As a result, 30%-40% of all imported biodiesel and renewable diesel generated D6 RINs in 2013 and 2014.[14,15] Under the scenario examined, we can expect that the RINs market will equally incentivize biodiesel demand from the expanded potential feedstock pool, a

[13] USDA FAS, Market and Trade Data: Table 03: Major Vegetable Oils: World Supply and Distribution 2015
[14] EPA 2013 RINs Supply Docket EPA-HQ-OAR-2015-0111-0003
[15] EPA 2014 RINs Supply Docket EPA-HQ-OAR-2015-0111-0004

significant reduction in concerns for feedstock needed for expanded production.

RINs Prices under Increasing RFS Demand

Figure III.D.1-1
RIN Prices: July 2011 – July 2014



Source: EPA (RFS proposal) Figure III.D.1-1, modified by Stratas Advisors for clarity

Renewable Diesel Production

The EPA states a maximum annual renewable diesel production of 269 million RINs in 2014.[16] U.S. Renewable Diesel production and consumption is not tracked by the EIA, so we use the EPA data for the EIA scenario. In the renewable diesel imports section, we discuss data that the EIA does track.

Three RFS-registered commercial renewable diesel facilities have produced renewable diesel with RINs over the last 3 years. One facility has closed permanently and another, REG Geismar, was closed in April but is expected to re-open by August 2015.[17] The longest running facility is the Diamond Green Diesel plant. Although renewable diesel operating capacity is not tracked by EIA, it's currently operational and has a listed capacity of 150 million wet gallons (255 million RINs),[18] which approximates data used on biodiesel capacity in the base case scenario. There is no

[16] EPA 2014 RINs Supply Docket EPA-HQ-OAR-2015-0111-0004
[17] REG press release April 7, 2015
[18] Company Website www.diamondgreendiesel.com

historical production data for these plants, either publically available or that can be implied from the available EPA data, and modelling expansion of capacity beyond nameplate is not warranted.

For purposes of the base case scenario, we apply similar criteria as used for biodiesel production and use only operating capacity, and assign a maximum potential of 255 million RINs. For the maximum capacity scenario, we include the REG Geismar Plant's renewable diesel production capacity for a total of 362 million RINs,[19] which is reasonable considering the operation history for the plant, nature of the closure, the resources available to the operating company, and that its capacity was operational and included in the 2014 EPA data.

Biodiesel Imports

There is significant room for increasing current biodiesel imports from foreign production. Global trade of biodiesel exceeds 1.5 billion gallons annually[20] and the European Union alone had 4.689 billion gallons of underutilized production at operational biodiesel plants in 2012 and is estimated by the USDA to have similar rates in 2015.[21] The RFS program has over 69 foreign biodiesel plants registered to produce RINs as of December 2014,[22] and the EPA noted that foreign registrations are expanding, particularly in Argentina.

EIA maximum monthly biodiesel imports were 74.1 million wet gallons in December of 2013.[23] Annualized, this translates to a potential 1.33 billion RINs generated. The three month average of imports for October through December 2013 translates to 1.16 billion RINs generation, which indicates that the import transport systems and infrastructure are capable of handling high throughput levels for biodiesel. The EIA's total annual biodiesel import data for the record 2013 year translates to 513 million RINs, which was higher than EPA's data on biodiesel imports that generated 280 million RINs.[24]

Because 2013 had additional incentive for biodiesel demand due to the $1 per gallon tax credit, and RINs do not appear to have been generated for all 2013 imports, some imported biodiesel may have been from foreign plants that are unqualified to generate RINs. Therefore, we cannot use the peak EIA import data for modelling potential maximum RINs generation rates from imports. In 2014, while there was no tax incentive in place, the EPA showed 272 million wet gallons of imports[25] arriving and generating RINS, while the EIA data shows 212 million wet gallons of imports.[26] The 2014 EIA monthly peak import rate, annualized at 498 million wet gallons, can be judged to be only incentivized by the 2014 RINs market and represent RINs-generating biodiesel, which translates to a maximum import rate of 748 RINs from biodiesel.

[19] REG has a 75 million wet gallon capacity per website, of which 85% is renewable diesel
[20] USDA FAS: multiple GAIN Country Annual Reports
[21] USDA FAS GAIN Report Number: NL4025 EU Biofuels Annual 2014
[22] EPA Part 80 Fuels Program List
[23] EIA Total Energy Table 10.4, June 2015
[24] Ibid.
[25] EPA 2014 RINs Supply Docket EPA-HQ-OAR-2015-0111-0004
[26] EIA Total Energy Table 10.4, June 2015

It can be assumed that under these maximum scenarios driven by a market incentivized by RINs, all imported biodiesel would be RIN generating, as there is significant foreign operating capacity registered with the RFS (for example, Indonesia and Malaysia have 1.314 billion RINs of operating biodiesel capacity at plants registered with the RFS).[27] However, modelling the ability of the U.S. demand to increase biodiesel import rates above historical demonstrated levels (from the large pool of internationally traded biodiesel volumes) is not possible because specific export activity from RFS-registered foreign capacity is unavailable. For the base case maximum scenario and maximum scenarios, we limit the imports to demonstrated peak levels of (likely RIN-generating) imported biodiesel. The intent or ability of the foreign, RFS-registered plants to increase rates exportation of RINS generating product to the U.S. product remains outside existing data, although certainly additional RFS-generating biodiesel capacity is delivering biodiesel into the global market that could be absorbed by the U.S., producing a significant up- side uncertainty on these maximums.

Renewable Diesel Imports

To date, the maximum amount of imported renewable diesel according to the EPA was 559 million RINs in 2014 (328 wet gallons @ 1.7 RINs per wet gallon). The EIA data specific to renewable diesel[28] shows only 121 million wet gallons imported in 2014, which would translate to 205 million RINs if the equivalence value of the product were similar to that tracked by the EPA. This is likely because much of the renewable diesel is also tracked under the EIA import category of "Biomass-Based Diesel (Renewable)". However, since that category also includes biodiesel, we restrict our analysis to the renewable diesel-specific data set. The peak EIA import rate for renewable diesel was 36.4 million wet gallons for August of 2013, which translates to an annualized import rate of 742 million RINs per year. However, as we indicate below, we can use 2013 data despite the presence of the $1 per blender's tax credit, since the importers from that period were registered with the RFS and could be assumed to continue operations with RINs prices replacing the blender's tax credit.

There are only 3 registered foreign renewable diesel plants at commercial scale, all owned by Neste. These plants can produce a combined capacity over of over 3 billion wet gallons per year,[29] however, it is not known if more than 2.5 billion wet gallons are registered to produce RINs under the RFS program. The known RFS-registered capacity translates to a minimum of 4 billion RINs (the energy equivalence value of renewable diesel imports is typically 1.7 but depends on many factors and historical data are proprietary, so a conservative lower value of 1.6 RINs per gallon is used here). According to its annual report, Neste sold 2.69 billion wet gallons of product in 2014, which translates to a minimum of 4.3 billion potential RINs.

Almost the entire production from the Neste Singapore plant (minimum capacity 1.6 billion RINs

[27] EPA Part 80 Fuels Program List, company websites
[28] EIA Petroleum and Other Liquids, Imports by country of Origin, U.S. Other Renewable Diesel Imports
[29] Neste 2014 annual report http://2014.nesteoil.com/

per year) is exported each year. Since the Singapore facility is; 1) known to be operational, 2) trading its full production through exports, 3) registered with the RFS, 4) has a demonstrated trading ability with the U.S., and, 5) is capable of producing RINs with most available feedstocks (it is grandfathered facility), it is appropriate to assume that significant RFS incentive could capture the full potential 1.6 billion RINs of exports in the maximum scenario. In addition, 62 million RINs worth of the EIA total 2013 renewable diesel imports came from Finland, almost certainly production from Neste's Porvoo facility. However, since general export data from that facility are unknown, and the intention for the production at the Porvoo facility is unknown for 2016, we do not model additional potential Porvoo production and imports above known peak rates of exports to the U.S.

Biodiesel Consumption

The maximum historical annual data from EPA shows 2,073 million RINs of biodiesel consumption in 2013.[30] This includes 94 million gallons of corrections that may include spillage or consumption outside of transportation or heating oil, so they are not included in this figure (as they are in production and imports), though this significant number (4.5%) implies upward error considerations. Maximum EIA consumption rates occurred in December of 2013, with biodiesel consumption equaling 4.4% of consumption of the transportation and heating oil pool distillate pool.[31,32] Using EIA projections for consumption numbers for this pool in 2016, this translates to an EIA historically annualized peak scenario consumption rate of 3,599 million RINs of biodiesel.

To calculate a maximum consumption rate, we look for the most limiting factors to consumption capacity. In general, for blend and consumption rates we look at limitations from compatibility with equipment (including vehicle), distribution, and utility concerns.

For equipment compatibility in both the transportation and heating oil industry, there are 2 significant biodiesel blend levels that are standardized, namely blend levels up to 5% (B5) and blend levels above 5% up to 20% (B20). The standard heating oil and diesel specifications allow up to 5% biodiesel content. This means that all diesel and heating oil equipment and infrastructure is de-facto compatible with biodiesel usage at 5%, and there are no significant technical barriers to usage in the current vehicle fleet or heating systems. The average blend level of biodiesel was just below 3% nationally in 2014.[33] Biodiesel blended below 5% meets the definition of diesel and heating oil, and is most commonly sold without notifying labels and therefore has no customer-acceptance (customer compatibility) barriers even if they have concerns for older vehicle or equipment.

Greater than 90% of on-road consumption of diesel is in the medium and heavy duty market, and

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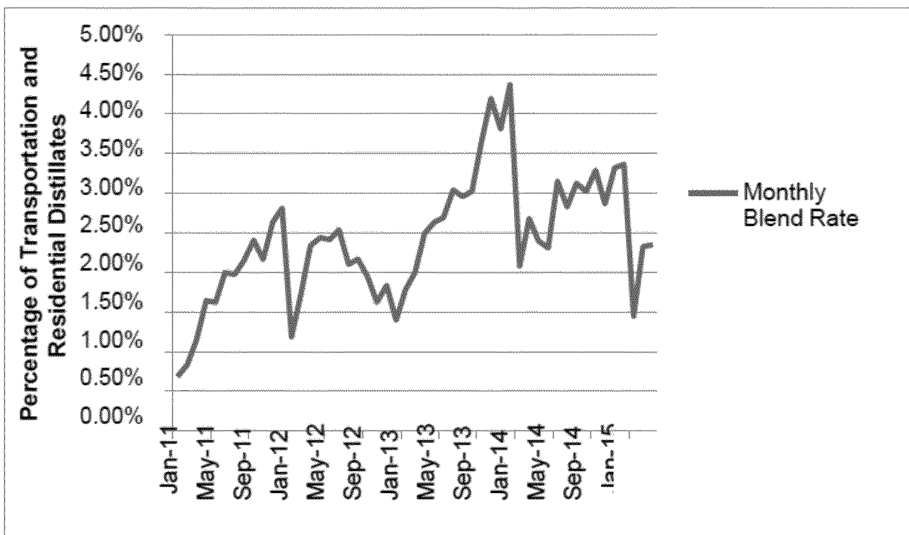
30 EPA 2013 RINs Supply Docket EPA-HQ-OAR-2015-0111-0003
31 EIA Total Energy Review Table 10.4
32 EIA Monthly Energy Review, June 2015
33 Ibid

the EPA acknowledges that "most medium and heavy duty vehicle manufacturers warrantee use of blends up to B20 in their more recent models".[34] 10% blend levels are mandated for diesel sale in Minnesota from April to September, and Illinois has a history of 11% blend sales because of tax breaks that are maximized at that level, and there are no significant reports of equipment issues. There are multiple retail locations that offer B20, and multiple heating oil distributors sell B20 heating oil. However, the transportation fleet and heating oil equipment pools still contain significant percentages that are not warranted or deemed compatible with levels of biodiesel above 5%.[35] Blend levels above 5% but below 20%, are sold under the B20 diesel and heating oil specification and are required to be identified as B20, so customer compatibility can be a factor.

Since there is no significant consumption data on blends above 5%, and because usage above 5% cannot be expected to be accepted by the entire market, we put upper bounds on our maximum blend level at 5%. However, the known usage above 5% puts more upward weighting on expectations to achieve at least a 5% blend under conditions.

Historical Biodiesel Blending vs. Transportation and Residential Heating Oil Distillates



Source: EIA, Stratas Advisors

Another concern listed by the EPA around increasing blend levels is the seasonal utility of biodiesel blends, as some types of biodiesel blends have lower cold-flow characteristics than petroleum diesel. Biodiesel quality has improved with regards to winter use, most recently with

[34] EPA Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-based Diesel Volume for 2017
[35] NORA: Developing a Renewable Biofuels Option for the Home Heating Sector, 2015

adoption of new grade specifications designed to accommodate multi-season use. In moving to 5% levels, the data indicate that this will not be an issue. EIA data (see table above) indicate that blend levels have historically increased 3 out of 4 years during cold weather (even after adjusting for calendar effects from year-end tax--specific changes). Oregon and Minnesota, inarguably not a mild-winter state, have mandated the use of 5% biodiesel blends through several winters. Because of these data, we do not present any seasonal constraints to our maximum blend rate of 5%.

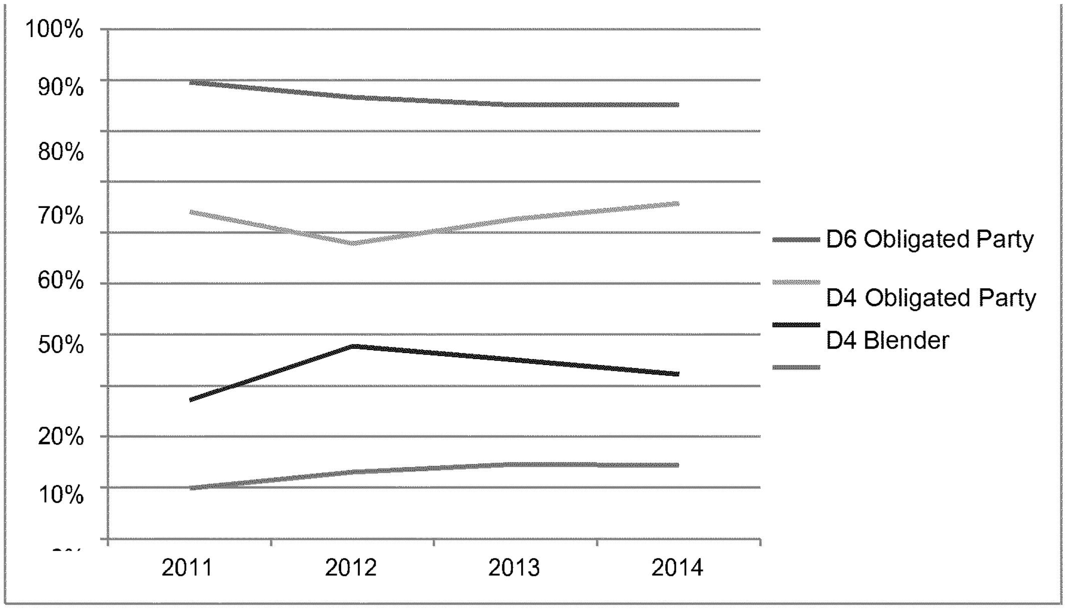
There is little evidence of transportation and distribution issues constraining levels of blending below 5%. The EPA is in general agreement, and there have been very few comments[36] to date on issues surrounding increasing biodiesel transportation or distribution. Like ethanol, biodiesel has traditionally been distributed from plants to the terminals for further distribution, and biodiesel often benefits from the transportation infrastructure (mostly rail) already in place to achieve national saturation of ethanol distribution for blending at terminals.

However, unlike ethanol, biodiesel is often blended into existing diesel tanks and does not always requiring installing separate storage and blending infrastructure to start new blending at a terminal, depending on the operation. And, unlike ethanol, options for pipeline transport are increasing, opening opportunities for certain refiners to enter into biodiesel blending for the first time. A February 2015 revision in to the ASTM 1655 specification for jet fuel raised the allowable amounts of biodiesel in these fuels from 5 ppm to 50 ppm. This 0.005% FAME acceptable-contamination level is expected to allow jet fuel to remain in-spec after travelling in pipelines also used by diesel with low blends of biodiesel.

Biodiesel purchasing by obligated parties has lagged behind their ethanol efforts, particularly by merchant refiners with no rack operations where biodiesel is normally blended (see figure below). If pipeline operators feel 50 ppm provides enough cushion against cross-contamination of jet fuel (the original effort was for 100 ppm), many new obligated parties may be able to get into the biodiesel blending business at their refineries for the first time. Strong incentives exist to increase refinery level biodiesel blending for economies of scale and RINs quality assurance. This greater upstream blended product availability, combined with pipeline utility, will help blends reach terminals and/or small operators through existing networks and infrastructure that might otherwise have infrastructure or logistical challenges to blending biodiesel.

[36] EPA: Renewable Fuel Standard Program Summary and Analysis of Comments, Chapter 6.

RINs Separation by Party



Source: Stratas Advisors, EPA data, July 2014

To date, there has been very little comment on infrastructure or blending limitations hampering biodiesel use above 5% under the RFS. A maximum of 5% seems conservative in light of data showing sustained U.S. consumption at 4% for 3 months and mandates from several states indicating annual blend rates already at or above 5% levels.

Renewable Diesel Consumption

Renewable diesel has few limitations to consumption and use has expanded rapidly. Since renewable diesel blending can be un-reported in diesel transactions, actual blend rates are unknown. Reported blend rates of 20% or more are likely, though no proprietary information is available to confirm this. No engine manufacturers have expressed concern over current or future expected blending rates of renewable diesel. Renewable diesel is for the most part fully compatible with the existing distribution and retail infrastructure for diesel and heating oil. Cold weather properties for renewable diesel are generally similar to diesel with a few exceptions for differing feedstocks. In all scenarios, practical consumption of renewable diesel in the U.S. for 2016 is therefore limited by availability.

It should be noted that many aviation operations are experimenting with renewable diesel blending, which allows for RINs generation, but this expands, not limits, potential consumption moving forward. There are no data sources on blending of any biofuels into aviation fuel at this time, so this will not be included in the analysis.

Summary

Maximum Potential RINs Generated from Biodiesel (Millions of RINs)

Scenario	Maximum U.S. Production	Maximum Imports	Maximum Supply (Production + Import)	Limitation from Maximum 2016 Consumption	Maximum RINs Generated
Maximum Capacity Scenario	4,140	748	**4,888**	4,091 (5% blend rate)	**4,091**
Base Case Scenario	3,253	748	**4,001**	3,599 (Historical Max 4.4% Blend Rate)	**3,599**
EIA Historical Monthly Peak Data Scenario	2,474	748	**3,222**	3,599 (Historical Max 4.4% Blend Rate)	**3,222**
EPA Historical Annual Maximum Scenario	2,076	280	**2,356**	2,073 [Historical Maximum]	**2,073**

Source: Stratas Advisors

ED000569_003756

Maximum Potential RINs Generated from Renewable Diesel (Millions of RINs)

Scenario	Maximum U.S. Production	Maximum Imports	Maximum Supply (Production + Import)	Limitation from Maximum 2016 Consumption	Maximum RINs Generated
Maximum Capacity Scenario	362	1,662	**2,024**	-	**2,024**
Base Case Scenario	255	742	**997**	-	**997**
EIA Historical Monthly Peak Data Scenario	269*	742	**1,011**	-	**1,011**
EPA Historical Annual Maximum Scenario	269	553	**822**	-	**822**

*Since EIA does not track renewable diesel production, EPA total annual production data is used in this instance.

Source: Stratas Advisors

Discussion

The techniques used to arrive at the maximum values shown in this analysis are conservative and based primarily on previously achieved levels of RINs generating activity. Significant probable additional RINs generation is unexplored because of a lack of data meeting the criteria for these scenarios. For example, large amounts of RINs-generating, internationally-traded, non-ethanol biofuels have been left out of the imports analysis. Diversion of portions of these large traded volumes is likely to be the swiftest initial response to a high demand scenario. New capacity expected to come on-line by next year is not included, in contrast with EPA's projections that include new capacity additions. Non-ethanol biofuels consumption has shown the greatest response to increases in market incentives from RINs prices. Given the recent history of market response to even mild increases in the RFS demand, RINs prices should increase significantly under a high demand scenario and produce dramatic increases in RINs production from non-ethanol renewable fuel sources.

Notes and References

Notes

1. For EMTS data, we do not discount RINs error correction (as does the EPA) for production or imports, because the reasons for the error corrections are not available to the general public for specific fuels, It is assumed for this analysis that most error correction in 2013 and 2014 do not involve incorrect accounting of physical product produced or imported, but instead the

nature of the product's ability to eventually qualify for RINs (aka compliance reasons or errors before qualifying use). For instance, we would assume that volume use for 'purposes other than transportation fuel, heating oil, or jet fuel' (historically "error corrected") would instead be incentivized to be used in RINs generating purposes in a maximum usage scenario. Spills or accidents do not subtract from discerning actual production or import rates. However such corrections are applied to consumption analysis.

2. For projected and historical diesel and heating oil consumption numbers, we use distillate and kerosene in transportation and residential categories. For historical numbers, we use the EIA June 2015 Monthly Energy Review. These EIA numbers include biodiesel volumes. For 2016, we use the same categories taken from the EIA's 2015 Annual Energy Outlook, April 14, 2015 (54.54 billion gallons of transportation and residential distillates).

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Exhibit 3

Analysis of Fleet Percentage of 2001+ Model Year Group In Calendar Years 2014, 2015, and 2016

Prepared for Growth Energy by Air Improvement Resource, Inc.

July 27, 2015

This study evaluates vehicle population portions, vehicle miles traveled, and energy consumed for a number of segments of the on-road vehicle population that are capable of utilizing E15, a mixture of 15% ethanol and 85% gasoline (by volume). We evaluate this information for the 3 calendar years of EPA's proposal, or 2014-2016.

One estimate of the portion of these vehicles that are capable of using E15 is all 2001 and later vehicles. EPA waived E15 for all 2001 and later vehicles in 2010. In 2014-2016 the majority of vehicles on the road, and the majority of fuel consumption, will be by 2001+ vehicles. Of course, all FFVs, whether they are pre-2001, or 2001 and later vehicles could also use E15.

While EPA waived E15 for 2001 and later vehicles in 2010, many manufacturer vehicle warranties did not include ethanol levels up to E15 until model year 2012. Consequently, while EPA waived E15 use for all 2001 and later vehicles, some 2001 and later vehicle owners may be reluctant to fuel with ethanol levels up to E15, out of concern of potentially voiding the warranty. It is possible, however, that once a vehicle is no longer under warranty (for example, when the vehicle odometer reading reaches 100,000 miles, or the age of the vehicle reaches 10 years), these owners may no longer be reluctant to fuel with ethanol levels up to E15. Thus an alternative estimate of the portion of vehicles that could use E15 would be (1) all FFVs, (2) 2012 and later non-FFVs that have explicit allowance for vehicle warranty up to E15, and (3) 2001+ non-FFVs that are no longer under warranty.

In this study, we evaluate in many cases vehicle populations portions and fuel consumed in the 2014-2016 timeframe. The portion or fraction of fuel consumed, however, is a better measure of E15 use than vehicle populations, because by-model-year fuel economy varies widely in the on-road light duty vehicle and light duty truck population, due to the recent implementation of EPA GHG emission standards.

The following topics are covered:

- Portion of fleet that is approved by EPA for use of E15
- FFVs on the Road
- Portion of fleet that is warrantied for E15
- Portion of 2001+ model year fleet that is out-of-warranty

- Summary of FFVs, 2012+Non FFVs with E15 Warranties, and 2001+ Non FFVs with 100K+ Miles

Portion of Fleet That Is Approved for Use of E15

In October 2010, the U.S. Environmental Protection Agency (EPA) approved a waiver permitting the use of E15 (a mixture containing 15% ethanol) in model year 2007 and newer autos and light duty motor vehicles (LDVs). In J anuary 2011, the EPA extended the waiver to permit the use of E15 in 2001 to 200 6 model year autos and light duty vehicles. Of course, Flexible Fuel Vehicles (FFVs) are also permitted to use E15. E15 is not allowed in 2000 and earlier vehicles, or in off-road vehicles.

Because E15 has been approved by EPA for use in 2001 and later vehicles, it is instructive to examine the population fractions of the fleet of vehicles on the road that are 2001 and later vehicles. We used the MOVES2014 model, December 2014 version to estimate the percent of 2001 and later model year group on-road light duty vehicles and trucks (LDT) in the fleet in calendar years 2014, 2015, and 2016. We performed this for 3 different parameters – population, vehicle miles traveled (VMT), and energy. Results are shown in Table 1.

Table 1. Analysis of Fleet Percents, Gasoline + Ethanol (E85) Vehicles MOVES2014-Dec14				
CY	Parameter	Class	MY2000-	MY2001+
2014	Population	LDV	25.86	74.14
		LDT	22.44	77.56
		Combined	24.31	75.69
	VMT	LDV	18.32	81.68
		LDT	15.25	84.75
		Combined	16.84	83.16
	Energy	LDV	18.98	81.02
		LDT	16.09	83.91
		Combined	17.38	82.62
2015	Population	LDV	20.94	79.06
		LDT	18.59	81.41
		Combined	19.87	80.13
	VMT	LDV	14.22	85.78
		LDT	12.12	87.88
		Combined	13.21	86.79
	Energy	LDV	14.98	85.02
		LDT	13.15	86.85
		Combined	13.97	86.03
2016	Population	LDV	16.85	83.15
		LDT	15.29	84.71
		Combined	16.15	83.85
	VMT	LDV	10.98	89.02
		LDT	9.58	90.42
		Combined	10.31	89.69
	Energy	LDV	11.80	88.20
		LDT	10.72	89.28
		Combined	11.21	88.79

For example, Table 1 shows that 83.85% of combined light duty autos and light duty trucks are 2001+ vehicles in calendar year 2016 and that these 2001+ vehicles accumulate nearly 90 percent of the vehicle miles traveled, and 89% of the energy. This percentage also includes 2001+ FFVs. Pre-2001 model year FFVs are not included in this percentage, but clearly the pre-2001 model year FFVs could also use E15.

Table 2 shows the populations of 2000- and 2001+ LDV and LDTs (combined). In this table, we have used vehicle populations from AEO2015 for 2014-2016 and the percent values in Table 2 to show the populations. [1] In 2016, for example, there will be 194.6 million cars and LDTs on the road, which EPA says are capable of using E15.

Table 2. 2000- and 2001+ LDV+LDT Populations			
CYR	AEO2015 LDV+LDT Population (million)	MY2000- (millions)	MY2001+ (millions)
2014	226.6	55.1	171.5
2015	229.3	45.6	183.7
2016	232.1	37.5	194.6

FFVs on the Road

There are a number of different estimates of FFVs on the road. EPA indicated it the NPRM on page 33121 that there were "about 14 million FFVs on the road" in 2014, and on page 33128 they indicate that in 2016 there will be about 16 million FFVs. [2] EPA cites AEO2015 for the 2016 figure. The Alternative Fuel Data Center (ADFC) webpage for FFVs indicates that "there are more than17.4 million FFVs on U.S. roads today," citing data from R. L. Polk.[3] AEO2015 contains the data in Table 3 for FFVs on the road. The AEO2015 data are at least consistent with EPA's statement of there being around 14 million FFVs on the road, although the EPA value appears to be somewhat low in comparison to the AEO2015 value for 2015 of 14.88 million. Many of these vehicles, however, would also be included in Table 1; some of which would even be 2000- vehicles, and most would be 2001+ vehicles.

Table 3. AEO2015 "Ethanol-Flex Fuel ICE" Stock (millions)			
Calendar year	Cars	LDTs	Total
2012	2.38	8.18	10.56
2013	2.67	9.27	11.94
2014	2.96	10.38	13.35
2015	3.23	11.64	14.88
2016	3.50	12.82	16.32

[1] http://www.eia.gov/forecasts/aeo/

[2] 40CFR Part 80, June 10, 2015, Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017; Proposed Rule, pages 33121 and 33128.

[3] See http://www.afdc.energy.gov/fuels/ethanol.html. AFDC cites the Polk website at http://www.Polk.com.

Portion of Fleet That Is Warrantied for E15

All FFVs, no matter what model year, are warrantied for E15. As noted above, there are 14.9 million FFVs on the road in 2015, comprising about 6.5 % of the fleet, and it is projected that there will be 16.32 million FFVs on the road in 2016, comprising about 7.0% of the fleet.

Prior to model year 2012, most if not all manufacturer warranties indicated that, with the exception of FFVs, the maximum ethanol concentration that should be used is E10, or 10% ethanol. Because EPA waived E15 for 2001+ vehicles, in model year 2012, auto manufacturers started revising their vehicle warranties to include ethanol concentrations up to 15%.

The Renewable Fuels Association (RFA) has compiled data on manufacturers that warrant the use of ethanol in gasoline up to 15% between 2012 and 2015 model years. These data are shown in Attachment 1. [4] For each model year, RFA indicates whether the manufacturer's warranty information (1) explicitly allows E15 in all vehicles, (2) allows E15 in some models, or (2) does not allow E15 in its models. The table also shows the market share by each manufacturer; importantly, the table limits the data to the non-FFV population for each model year.

The American Petroleum Institute (API) also has a table showing much the same information as RFA.[5] The API table, however has somewhat more information on which models have explicit warranties, for manufacturers that only have warranties for some of their product line. Lacking model-by-model sales information, however, we opted to use the RFA information, and include a portion of the market share for some of the manufacturers that only had part of the product line with an E15 warranty. When we compared API's lists of models with E15 warranties with our assumptions, we determine that our assumptions are conservative, i.e., we don't appear to be over-predicting the manufacturers that have only a part of their product line having E15 warranties.

In this analysis, we estimate the portion of vehicle sales by model year that are warrantied for E15. We also estimate the average portion of vehicles that are warrantied for E15 for 2012-2016 model years. The following methods were used:

1. For model years 2012 and 2013, we added the market share of the available manufacturers that have an explicit warranty for E15 (GM in 2012 and GM and Ford in 2013). The vehicle sales value for 2012 is 17.8% and for 2013 is 33%.

---

[4] RFA reference

[5] See http://www.energytomorrow.org/blog/2015/may/consumer-interests-ahead-of-ethanol-interests

2. For model year 2014 we added all the manufacturers that explicitly warrant for E15. However, 3 manufacturers – Honda, Mercedes Benz, and Toyota, have an explicit warranty for E15 in "some models". For these 3 manufacturers, we assumed that each manufacturer warrantied for E15 in 33% of its models. This resulted in 3% for Honda, 0.7% for Mercedes-Benz, and 4.7% for Toyota. The total vehicle sales then for 2014 was 43.6%.

3. For 2015, we followed the same process as in 2 for Mercedes Benz. To determine Toyota, however, we need to know the percent of Toyota sales that is Lexus. Toyota's March 3, 2015 press release indicates that for February 2015, Toyota sales were 180,467 units. Of these, 22,995 units (13%) were from Lexus. We will assume 15% of Toyota sales in 2014 were Lexus, with the remaining 85% Toyota. For the 15% of Lexus, we will further assumes 33% explicitly allow E15. Thus, for 2014, the total for Toyota is (85%*14.4%+ 15%*33%*14.4%) = 12.9%. The total vehicle sales for 2014 then is 58.4%.

4. For model year 2016, we assume the same value as for 2015.

Results are summarized in Table 4. The average percent of vehicle sales for 2012-2016 allowing E15 is 42.2%. Table 2 also shows sales of cars plus light duty trucks for each model year (2015 and 2016 are AEO's projections), and, multiplying the E15 warranty sales fractions times the sales yields total vehicle counts. Assuming negligible vehicle attrition over the 5-year period there will be 32.9 million non-FFVs on the road in 2016 with explicit E15 warranties.

Table 4. Fraction of Manufacturers Including E15 in Warranty Statements for Full Product Line

Model Year	Percentage of Vehicles Warrantying for E15 in Full Product Line	Model Year Sales, AEO2015	E15 Vehicles
2012	17.8%	13,702,834	2,439,104
2013	32.9%	14,380,537	4,731,197
2014	43.6%	15,237,754	6,643,661
2015	58.4%	16,260,780	9,496,296
2016	58.4%	16,397,999	9,576,431
Average, Model Years 2012-2016, or Total	42.2%		32,886,689

<u>Portion of Fleet That Is Out of Warranty</u>

We also examined the percent of 2001-2011 vehicles that are out of warranty. Vehicle and engine powertrain warranties can vary significantly between different auto manufacturers. We are assuming that the relevant warranties in this case are the powertrain warranties because fuel is used by the powertrain, although emission-related warranties for the catalytic converter and other emission-related components and controls are probably also very relevant.

Time did not permit us to examine all of these different warranties to determine a detailed warranty cut-off (in vehicle age or odometer value) for the fleet of vehicles on the road. For this analysis, we assumed that if a vehicle reached either a vehicle age of 10 years, or 100,000 miles, that its powertrain and emissions warranty had lapsed. [6]

MOVES2014 contains mileage versus age distributions for LDVs and LDTs. These distributions have just one annual mileage accumulation for each age. For example, year 1 vehicles may be estimated to travel on average 14,000 mile the first year, 13,800 miles the second year, and so on. In MOVES, there is no further distribution of mileages for each age, only 1 average value. Vehicles reach the 100,000-mile cutoff well before they reach an age of 10 years. As a result, in examining the fraction of vehicles that are out of a powertrain or emissions warranty or both, we have used the 100,000-mile value alone.

In this analysis, the MOVES2014 was used to estimate the percent of 2001+ non-FFVs in calendar years 2014, 2015, and 2016 with odometer values above 100,000 miles. We begin with Table 5.

Table 5. Percent of On-Road LDV and LDT Fleet in Calendar Year 2014-2016 that are 2001+Vehicles With Odometer Values Above 100,000 Miles

Calendar Year	Percent	Number of Vehicles (millions)
2014	48.2%	109.2
2015	48.8%	111.9
2016	47.1%	109.3

The populations shown in Table 5 in the third column also include FFVs with 100K+ miles. To determine non-FFV 2001+ populations with mileages above 100,000 miles, we first determine the number of FFVs with 100K+ miles, then subtract the number of FFVs with 100K+ miles from the vehicle populations in Table 5. To determine an approximation of the number of FFVs with 100K+ miles, we multiply the FFV populations in Table 3 by the percentages in Table 5. [7]

---

[6] The emission-related warranties for partial zero emission vehicles, or PZEVs in states with the California LEV program, reach 150,000 miles.

[7] The FFV populations in Table 3 include all model years, not just 2001+ FFVs. However, a significant majority of the FFVs will be 2001+ FFVs.

- 2014 FFVs with 100K+ miles: 48.2% * 13.35 million = 6.43 million
- 2015 FFVs with 100K+ miles: 48.8% * 14.88 million = 7.26 million
- 2016 FFVs with 100K+ miles: 47.1% * 16.32 million = 7.69 million

Table 6 shows the estimate of non-FFV 2001+ vehicles with 100K+ miles.

Table 6. Percent of On-Road LDV and LDT Fleet in Calendar Year 2014-2016 that are 2001+Vehicles With Odometer Values Above 100,000 Miles			
Calendar Year	Number of Vehicles (including FFVs) With 100K+ Miles	FFVs (millions) With 100K+ Miles	Non-FFV 2001+ Vehicles with 100K+ Miles
2014	109.2	6.43	102.8
2015	111.9	7.26	104.6
2016	109.3	7.69	101.6

Summary of FFVs, 2012+Non FFVs with E15 Warranties, and 2001+ N on FFVs with 100K+ Miles

Table 7 below summarizes the 3 groups of vehicles, the FFVs, th e 2012+ Non-FFVs with E15 warranties, and 2001+ Non-FFVs with 100K+ Miles.

Table 7. Summary of Vehicles (millions)				
Calendar Year	All model year FFVs	2012+ E15 Non-FFVs	2001+ Non FFVs with 100K+ Miles	Total
2014	13.35	13.8	102.8	140.0
2015	14.88	23.3	104.6	142.8
2016	16.32	32.9	101.6	150.8

Attachment 1

RFA RENEWABLE FUELS ASSOCIATION

Automakers Explicitly Approving the Use of E15 in Owners' Manuals and/or Warranty Statements for Conventional (Non-FFV) Automobiles

E15 Explicitly Allowed in <u>All</u> Vehicles Models

E15 Not Allowed by OEM in All Vehicle Models

E15 Explicitly Allowed in Some/Most Vehicle Models

	MY 2012	MY 2013	MY 2014	MY 2015	2014 U.S. Market Share[1]
Audi					1.1%
BMW					1.9%
Chrysler Group					12.6%
Chrysler					
Dodge					
Jeep					
Ford Motor Company					15.1%
Ford					
Lincoln					
General Motors Corporation					17.8%
Chevrolet					
Buick					
Cadillac					
GMC					
Honda Motor Company					9.3%
Honda					
Acura					
Hyundai					4.4%
Jaguar					0.1%
Kia Motors					3.6%
Land Rover					0.3%
Mazda					1.9%
Mercedes-Benz					2.1%
Nissan Motor Company					8.5%
Nissan					
Infiniti					
Porsche					0.3%
Subaru					3.1%
Toyota Motor Corporation					14.4%
Toyota					
Lexus					
Volkswagen					2.2%
Volvo					0.3%
All Others					1.0%

[1] Year-to-date (Jan.-Sep.) market share data from Motor Intelligence.

Exhibit 4

Infrastructure Changes and Cost to Increase RFS Ethanol Volumes through Increased E15 and E85 Sales in 2016

Prepared for

Growth Energy

By

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Table of Contents

Executive Summary 1
1 The Objective of the Study 2
2 Ethanol and Gasoline Overview 3
2.1 Overview of Gasoline Distribution System – from the Refinery to the Terminal 3
2.1.1 The Marketing Storage Terminal 4
2.1.2 Retail Service Station 5
2.1.3 State and Local Government Regulations for Dispensing Equipment and USTs 7
2.1.4 Converting stations to E15 and E85 8
3 Analysis of E85 Service Station Infrastructure Capabilities 9
3.1 The E85 Base Case Assumptions 9
3.2 Case 1: Incremental E85 Volume through Existing Infrastructure 10
3.3 Case 2: Adding Second E85 Dispensers to Existing E85 Stations 11
3.4 Case 3: Adding E85 Dispensers to Existing E10 Stations 13
3.5 Case 4: Adding Second E85 Dispenser to Existing E85 Stations and Adding E85 Dispensers to E10 Stations 15
3.6 Transporting an Additional 1.84 bgy of Ethanol 16
3.7 Vehicle Impacts of an Additional 1.84 bgy of ethanol or 2.76 bgy of E85 16
3.8 E85 Summary 16
4 Analysis of E15 Service Station Potential Capabilities 17
4.1 Limitations on E15 blending 17
4.1.1 1 psi RVP Waiver 17
4.1.2 Many State and Municipal Gasoline Specifications Do Not Allow E15 17
4.1.3 Station Hardware Does Not Support E15 17
4.1.4 Expansion of the Ethanol Distribution System May Be Required 18
4.2 Potential Solutions to Avoid E15 Constraints 18
5 Routes to E15 Sales 20
5.1 E15 Sales in States without E15 restrictions 20
5.2 E15 in RFG Sales 22
5.2.1 E15 Sales Outside of the Summer Ozone Season 22
5.3 Blending E15 with Low RVP BOB 23
5.3.1 Cumulative Results of Three Courses of Action 24
5.3.2 Cumulative Results Adjusted for 11 Percent E10 Sales 25
5.4 Adjusted E15 Sales Volumes Based on Station Dispenser Replacement Schedule 25
5.5 Upgraded Dispensers can Easily Handle the New E15 Volumes 27
5.5.1 The Time since the Last Dispenser Replacement is Important 27
5.5.2 Station Costs to Upgrade to E15 27
5.5.3 Total Costs to Convert E10 Stations to E15 29
5.5.4 Costs for the Blender Pump Option 29
5.6 E15 Summary 30
6 The Best of both E15 and E85 31
6.1 Overall Summary 31

List of Tables

Table 1. EPA's RFS Proposed Standards in Billions of Gallons per Year (BGY) 2
Table 2. Existing E85 stations Total Volumes with 45,000 gpm Dispenser Throughput.... 12
Table 3. Existing E85 stations Total Volumes with 90,000 gpm Dispenser Throughput.... 12
Table 4. Total E85 and Ethanol Volumes Above E10 Blendwall from Additional E85 Dispensers at Existing E85 Stations.... 13
Table 5. Cost of Adding Additional E85 Dispensers at Existing E85 Stations 13
Table 6. Total E85 and Ethanol Volumes Above E10 Blendwall from Adding E85 Dispensers at E10 Stations 14
Table 7. Cost of Adding E85 Dispensers at E10 Stations 15
Table 8. Total E85 and Ethanol Volumes Above E10 Blendwall from Modifying Case 2 by Adding E85 Dispensers at E10 Stations 15
Table 9. Cost of Modifying Case 2 by Adding E85 Dispensers at E10 Stations 15
Table 10. Summary of Identified State Changes Required for E10+ 20
Table 11. Potential E15 Gasoline by State (Billion Gallons per Year) 22
Table 12. Volume Estimates of E15 that could be Blended with Low RVP BOB 24
Table 13. Total Potential E15 Sales (bgy) 25
Table 14. Total Potential E15 Sales Adjusted to Keep 11 percent of Sales E10 25
Table 15. E15 and Ethanol Volumes Above E10 Blendwall Under an Expedited Conversion Schedule.... 26
Table 16. Station Costs to Upgrade to E15 – Two Gasoline Tank Station 28
Table 17. Station Costs to Upgrade to E15 – Three Gasoline Tank Station 28
Table 18. Breakdown of E15 Stations by Number of Tanks 29
Table 19. Costs to Convert Stations from E10 to E15....29
Table 20. Cost to Add a Blender Pump 30
Table 21. The Addition of Second E85 Dispensers at E85 Stations plus the Expedited E15 Conversion Case 31
Table 22. Costs of Adding Second Dispensers to Existing E85 Stations plus the Expedited E15 Conversion Case 31

Table of Figures

Figure 1. Physical Flow of Gasoline, BOB and Ethanol 4
Figure 2. Distribution of Service Station Underground Storage Tanks 6
Figure 3. Typical Fuel Dispenser and Underground Storage Piping 7
Figure 4. Summer Gasoline Grades in the U.S. by Country 24

Executive Summary

Congress legislated both the 2005 Renewable Fuel Standard (RFS) and the updated 2007 Standard (RFS2) as a mechanism to mandate the phasing in of renewable biofuels into U.S. transportation fuels. On an annual basis, the administering agency, the U.S. Environmental Protection Agency (EPA), is expected to propose and finalize new standards for the four RFS categories of cellulosic biofuels; advanced biofuels, biomass-based diesel and total renewable biofuels. Ethanol has become the predominant biofuel used to meet three of the four RFS2 categories. Ethanol can be used in transportation fuel when it is blended with gasoline at various levels. The most popular of these has been E10, which is 10 percent ethanol and 90 percent gasoline blendstocks. Ethanol can also legally be blended as E15, a blend of up to 15 percent ethanol, or as E85. E85 can contain 51 to 83 percent ethanol blended with gasoline blendstocks or natural gasoline. E85 can only be used in Flexible Fueled Vehicles (FFVs). FFVs comprise about seven percent of the nation's transportation vehicle fleet.

As the RFS2 mandates for ethanol have risen, the nation has begun to approach the E10 blendwall, that point at which nearly all of the nation's gasoline has been blended at the 10 percent ethanol level. To get around the E10 blendwall, it is necessary to find pathways to blend more that 10 percent ethanol into ever larger portions into the nation's gasoline pool. E15 and E85 are the primary pathways to increase ethanol consumption beyond 10%.

In its latest RFS2 proposal for 2014, 2015 and 2016, EPA has proposed standards that result in modest increases in ethanol usage. Growth Energy has requested that Stillwater Associates examine the distribution infrastructure for pathways to potentially increase the supply of E15 and E85 at the retail station level. Stillwater has considerable experience in the transportation fuels distribution space.

Stillwater evaluated the current state of fuels distribution, from the supply source though the pipeline and terminal network to the service station and to the consumer. For E85, Stillwater found that there are enough E85 stations and E85 dispensers in the U.S. to meet the EPA's proposed ethanol increase for 2016 of 0.84 billion gallons of ethanol. In fact, the current inventory of E85 stations can supply enough E85 to increase ethanol usage by 1.0 billion gallons above EPA's proposed 2016 level. In addition, the same consumption could be achieved through lower throughput assumptions in two additional cases that Stillwater studied:

In the E15 evaluation, Stillwater was able to identify sufficient E15 sales to increase ethanol demand by around 1.0 billion gallons per year (bgy) in 2016.

Stillwater found that ethanol volumes can be increased significantly through the use of E15 or E85 by making relatively modest investments, or in one E85 case, no investments to retail stations. E85 expansion can use larger amounts of ethanol than E15 expansion because there are no state restrictions on the sale of E85. No other distribution infrastructure inadequacies were identified in any of the cases.

With sufficient economic drivers, enough additional E85 could be supplied to increase the volume of ethanol used in U.S. transportation fuel up to 1.84 bgy more than the expected 2016 E10 blendwall. E15 achieves lower levels of ethanol usage in 2016 but can still increase the volume of ethanol by 1.0 bgy through the conversion of E10 dispensers to E15 in states that permit E15 sales. Finally, these two approaches can be combined to potentially achieve ethanol usage levels of 2.90 bgy.

1 The Objective of the Study

On June 10, 2015, the EPA issued a notice of proposed rulemaking on the 2014, 2015 and 2016 Renewable Fuel Standards and the biomass-based diesel standard for 2017. In 2016 EPA is proposing standards that would increase mandated ethanol volumes by 0.84 bgy above the E10 blendwall. Growth Energy has requested that Stillwater Associates develop approaches that can potentially deliver the 0.84 bgy, plus an additional 1.0 bgy of ethanol through infrastructure solutions that will include examination of pathways for E85 and E15. This information will be used to aid in providing comments to the EPA regarding the recently proposed Renewable Fuel Standard (RFS) rulemaking. The prioritization for selected alternatives will focus on the lowest cost solutions achievable over the next six to 12 months necessary to achieve a targeted 1.84 billion incremental gallons of total renewable fuels over the RFS standards proposed for 2015.

The additional volumes of E85 and E15 determined in this study will represent potential incremental ethanol volumes above the E10 blendwall. Since the real world E10 blendwall is always moving, when this report refers to the E10 blendwall, it will mean the 13.69 bgy in 2016 that EPA uses in their recent proposal.

Table 1. EPA's RFS Proposed Standards in Billions of Gallons per Year (BGY)[1]

		EPA's RFS Proposal		BGY
		2014	2015	2016
Cellulosic	Ethanol			0.036
	Non- Ethanol			0.17
	Total	0.033	0.106	0.206
BBD		1.63	1.7	1.8
Advanced		2.68	2.9	3.4
Advanced Ethanol		0.235	0.35	0.7
Total Renewable		15.93	16.3	17.4
Corn ethanol		13.25	13.4	14
Total Ethanol		15.93	13.75	14.53
Blendwall			13.78	13.69
Additional ethanol needed				0.84

Stillwater will NOT examine the actual production capacity of ethanol manufacturing facilities but will assume that sufficient domestic production is available to fulfill the incremental supply. Additionally, Stillwater will assume the model year 2001 and later U.S. automobile and truck fleets are capable of using E15 and that original equipment manufacturer warranty issues will not impede renewable fuel consumption. Support, or lack thereof, from the oil industry and renewable fuel blend retail pricing are assumed to be out of scope for the purposes of this report.

We will assume that no E15 sales will occur in California (given the issues with its Predictive Model) or other states that have a regulatory mandated 10 percent ethanol maximum or other state gasoline specifications that would need to be changed to allow E15 sales.

[1]Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017; Proposed Rule, http://www.gpo.gov/fdsys/pkg/FR-2015-06-10/pdf/2015-13956.pdf

2 Ethanol and Gasoline Overview

Ethanol-gasoline blends are governed by a myriad of federal regulations, state regulations, local regulations, product quality restrictions, ethanol distribution systems, product transportation systems, product storage systems, product delivery systems, retail delivery equipment, the physical properties of ethanol, and materials compatibility with ethanol. All of these factors will be addressed in this paper. In addition, supply of ethanol and vehicle compatibility of ethanol-gasoline blends are factors that will not be covered in this paper.

Across the nation, the gasoline that is sold to consumers varies with the regulations and climate governing the area of sale. These regulations may be environmental, commercial or product quality based. Generally, gasolines fall into two major classifications, reformulated and conventional. Reformulated gasolines have rather strict compositional restrictions set by regulations while conventional grades do not have such restrictions although product quality standards apply. In addition to these major classifications, gasoline has volatility classes that limit potential vapor lock tendencies and/or regulatory restrictions to limit the vapor emissions. The American Society for Testing and Materials (ASTM) standards govern general gasoline volatility and assign geographical areas a volatility class based on season and location. ASTM volatility standards are not adopted by all states.

Regarding ethanol, there are four types of gasolines sold in the U.S.:

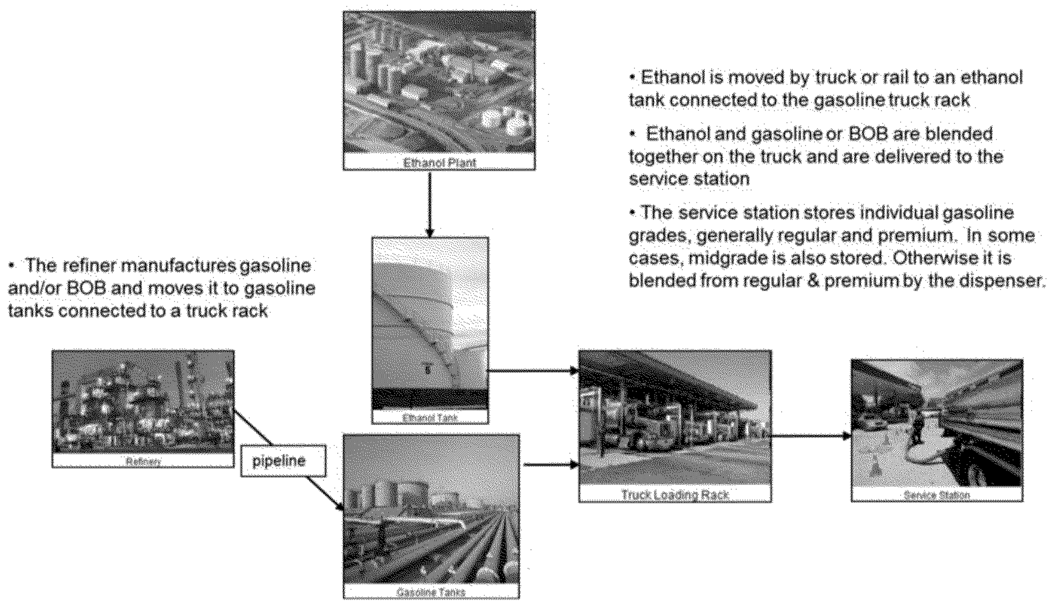
- Neat gasoline –Gasoline not containing ethanol. Neat gasoline sales volumes are small and limited to consumers that do not desire an ethanol blended gasoline. Alaska falls outside the RFS so gasoline in that state is neat.
- E10 – The predominant gasoline sold in the U.S. E10 contains approximately 10 volume percent of ethanol. It is produced by blending 10 percent ethanol with conventional gasoline where the Reid Vapor Pressure (RVP) waiver is effective, blending with a Blendstock for Oxygenate Blending (BOB) which is an unfinished gasoline that when blended with 10 percent ethanol will meet the applicable gasoline specifications, or blending with sub-octane gasoline which is a low octane unfinished gasoline that when blended with 10 percent ethanol will meet the required octane specifications.
- E15 – A gasoline containing 15 volume percent of ethanol. Starting in 2017 vehicles sold in the U.S. will be required to be compatible with this fuel. Only a small amount of the gasoline sold is E15. The factors that have restricted more widespread sales are discussed in this paper.
- E85 – A fuel that is 51 to 83 volume percent ethanol. The balance of the fuel is hydrocarbon. This fuel can be used in Flexible Fuel Vehicles (FFVs). Sales of E85 have been limited by availability and price. Because ethanol contains two-thirds of the energy of hydrocarbon gasoline, the price of E15 and E85 must be lower than E10 gasoline for the consumer to achieve the equivalent cost per mile.

This paper will describe and examine the various factors governing the use of ethanol in gasoline, and describe the potential and the changes required to increase use of E15 and E85 by the vehicle fleet.

2.1 Overview of Gasoline Distribution System – from the Refinery to the Terminal

The gasoline distribution system, for the purpose of this study, begins at the refinery. The refinery produces finished gasoline or a BOB, depending on the destination requirements for the product. BOB is blended downstream to make E10.

Figure 1. Physical Flow of Gasoline, BOB and Ethanol



Petroleum products leaving a refinery can be transported by tanker, barge, pipeline, railcar or truck. Fuel ethanol is somewhat different since it cannot be easily transported by pipeline. This restriction generally applies if it is shipped in neat form due to potential stress corrosion cracking, or, if it is shipped in a blend with petroleum products due to its tendency to phase-separate in the presence of water. As a result, fuel ethanol is usually shipped long distances by railcar, as part of either a manifest railcar or a unit train, from the ethanol production plant to the petroleum storage terminal or to an ethanol tanking facility where it is blended with unfinished gasoline to create E10 at a truck rack. From the truck rack, the E10 is trucked to the service station. The journey by railcar often terminates at a rail receipt hub where it is generally trucked to the petroleum storage terminal. Barges also move ethanol from the Midwest to the gulf coast. There are some exceptions involving marine vessels and dedicated short distance ethanol pipelines, but these exceptions are few in number.

2.1.1 The Marketing Storage Terminal

The terminal is the next link in the supply chain for refined product, detergent additives and fuel ethanol. Terminals in the U.S. receive gasoline product either by marine vessels or pipeline with shipping costs at approximately $0.07 to $0.12 per gallon. East Coast terminals are primarily either marine receipt terminals or pipeline terminals while the western U.S. terminals receive shipments by pipeline. The central region is composed of both marine along rivers and pipeline for the balance. Detergent additives are supplied by truck while fuel ethanol is delivered primarily by rail with exceptions in the Northeast and South where fuel ethanol is delivered by barge to some locations. Overall transportation cost for ethanol is approximately $0.25 per gallon because rail and truck movements are much more expensive than pipeline and barge movements.

Terminals can distribute gasoline via pipeline, such as the ExxonMobil, East Providence terminal which supplies an 81 mile pipeline to its satellite terminal in Springfield, MA and through a truck loading rack. Terminals blend BOB or gasoline with ethanol as the delivery truck is loaded. The blending ratios are controlled by automated blending electronic meters that calculate the quantity of ethanol to be loaded. Existing systems are designed in most locations for a 10 percent injection rate. The truckloading rate of BOB and ethanol will vary but levels can be as high as 1,000 gallons per minute (gpm). The loading racks, in most markets, are open 24/7. Computer chip access cards control tank truck loading by identifying the account information and products authorized. The terminal operators are responsible for the accuracy and calibration of all systems including BOB, ethanol and detergent additives.

Terminals generally have multiple storage tanks and configure each tank service based on estimated market volumes and pipeline or marine delivery rates into the terminals. Loading rack plumbing and metering is designed for current volume and ratios. Once the product is loaded on the truck, the truck operator assumes responsibility for custody, quality and safety of the product. It is the duty of the truck operator to ensure that a tank truck is properly loaded with correct ratios of ethanol and detergent additives. Product custody is transferred to the retail or commercial site once the delivery to the designated storage tank is completed. The U.S. Department of Transportation (DOT) and EPA require bills of lading (BOL) to follow product to the final destination. Tank truck maximum volumes vary by state because some states like New York and Michigan grant overweight permits that allow trucks to deliver as much as 14,000 gallons, while other states like Massachusetts and Rhode Island grant waivers for lesser volumes. The Federal Highway Administration (FHWA) permits an 80,000 lbs. gross vehicle weight that equates to approximately 9,100 gallons depending on the design of the truck.

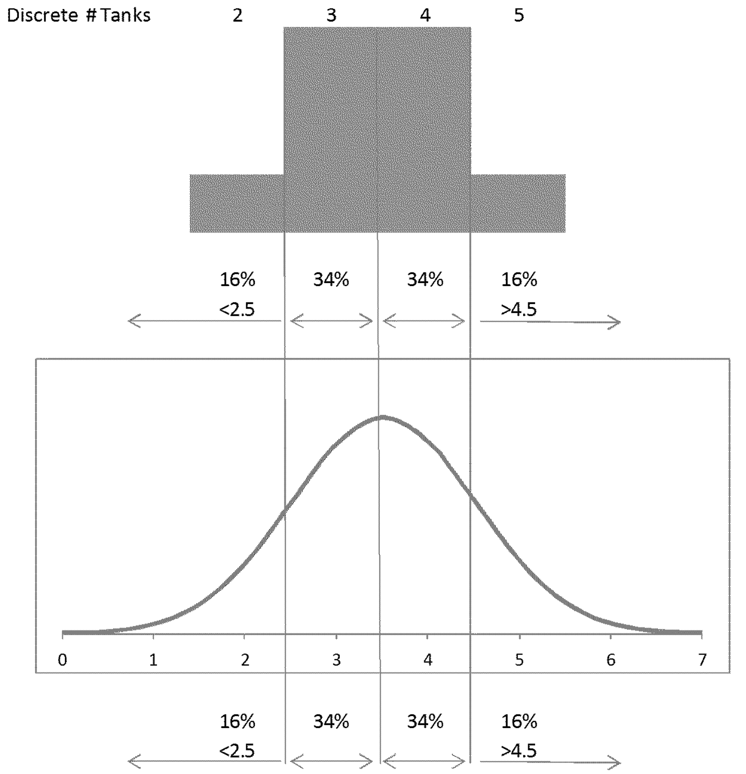
2.1.2 Retail Service Station

The service station retail site is the last link in the distribution system. There are approximately 153,000 service stations in the U.S.[2] Service stations vary in size but most will have at least two dispensers per island, specifically two cabinets with fueling nozzles on each side. Current data on underground storage tanks (USTs) is fragmented and inaccessible as a practical matter. It is captured by the states under multiple processes, using an assortment of data storage formats and reporting systems. In 1985 EPA did conduct a nationwide survey, The National Underground Storage Tank Survey, which specifically reported on tanks at service stations.[3] Although it is dated, because summary statistics from that report closely align with comparable summary measures from 2011 and 2012 U.S. and State Energy Act Reports, it was felt that the service station tank distributions reported in the older report would still have validity. The mean number of underground tanks at service stations was 3.5 to 3.6. EPA reported confidence intervals around those means that permitted a distribution to be estimated and portrayed as an integer distribution as shown in Figure 2.

[2] API. *Oil and Natural Gas Overview – Service Station FAQs.* February 28, 2014. http://www.api.org/oil-and-natural-gas-overview/consumer-information/service-station-faqs

[3] EPA. *Underground Motor Fuel Storage Tanks: A National Survey.* May 1986. http://www.epa.gov/oust/pubs/USTsurvey.htm

Figure 2. Distribution of Service Station Underground Storage Tanks



With respect to the incidence of three and four storage tanks per facility, the calculated distribution is roughly consistent with the results from a sample 203 stations separately surveyed by Stillwater in 2012.

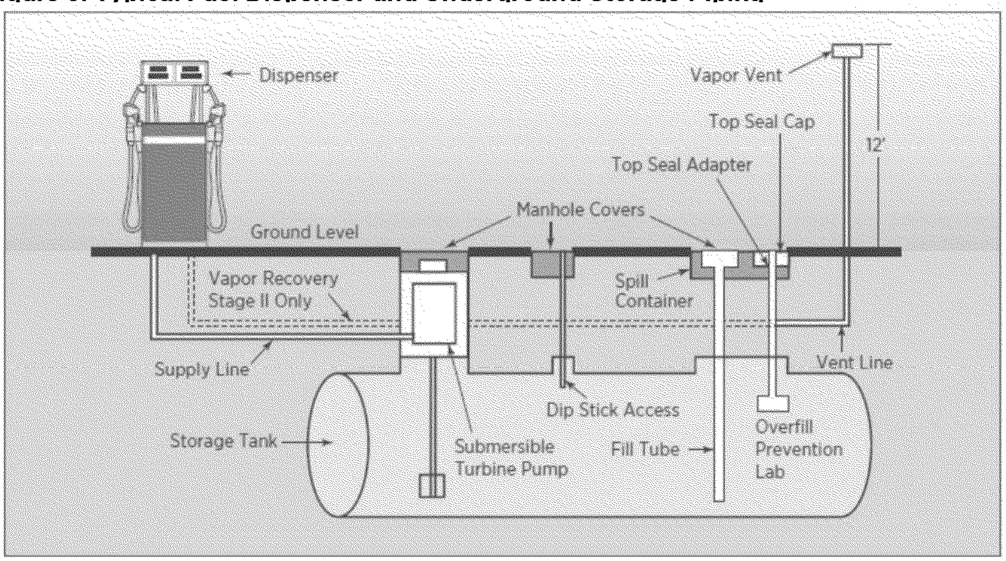
Approximately 34 percent of existing service stations have three USTs and 34 percent have four USTs. At about half of U.S. stations diesel is stored in one tank. Locations with two gasoline tanks generally have one tank in the higher octane gasoline while the other tank contains lower octane gasoline which can be blended. Sites with three gasoline tanks usually have the higher volume selling grade assigned to two of the tanks or it has a tank in each Regular, Mid-Grade and Premium. Some stations may have diesel in the third tank.

There are around 3,000[4] stations that offer E85. A number of states in the Midwest have a small number of stations that have more ethanol grades available. The USTs at these E85 stations are typically double walled fiberglass, and come with an Underwriters Laboratories, Inc. (UL) rating and are monitored by State and Federal environmental protection agencies. The tanks contain submersible pumps that draw down as low as two inches from the bottom. Service station tanks range in size from 8,000 gallons to 12,000 gallons. In many cases, tanks are piped together. Tanks also have tank support systems, which provide leak detection, outage prevention and water level monitoring. Product is drawn from the tanks when the consumer activates the dispenser by selecting the desired grade. The dispenser, the cabinet that is mounted on the individual island, also contains blender equipment that signals to the pumps the volume necessary for the grade to be blended. The blender equipment, pumps, and associated equipment have all met UL standards to operate at posted blend levels (i.e. E10, E85). This

[4] EPA. *Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017; Proposed Rule.* June 10, 2015. http://www.gpo.gov/fdsys/pkg/FR-2015-06-10/pdf/2015-13956.pdf

equipment is inspected and approved by local Weights and Measures agencies. Figure 3 shows a typical dispenser, underground storage tank and piping systems.

Figure 3. Typical Fuel Dispenser and Underground Storage Piping[5]



2.1.3 State and Local Government Regulations for Dispensing Equipment and USTs

State and local governments also play a role in regulating the safety of dispensing equipment and in implementing EPA's requirements for USTs.

For example:

- The Occupational Safety and Health Act (OSHA) allows states to develop and operate their own job safety and health programs. OSHA approves and monitors state programs and plans, which must adopt and enforce standards that are at least as effective as comparable federal standards. According to OSHA officials, there are currently 21 states with approved plans covering the private sector that enforce health and safety standards over the dispensing of gasoline within their respective states. Four additional states operate approved state plans that are limited in coverage to the public sector.
- Various state and local fire-safety codes—which aim to protect against fires—also govern the dispensing of fuel at retail fueling outlets. While state fire marshals or state legislatures are usually responsible for developing the fire code for their respective states, some states allow local Municipalities to develop their own fire codes. Fire codes normally reference or incorporate standards developed by recognized standards development organizations, such as the National Fire Protection Association and the International Code Council.[6] State, county, and local fire marshals are responsible for enforcing the applicable fire code within their respective jurisdictions. Local officials, such as fire marshals, typically inspect dispensing equipment for compliance with both state and local fire codes.
- States are largely responsible for implementing EPA's requirements under the UST program. EPA has approved 36 states, plus the District of Columbia and Puerto Rico, to operate programs in lieu of the federal program. The remaining states have agreements with EPA to be the primary implementing agency for their programs. Typically, states rely on Underwriters

[5] DOE Energy Efficiency & Renewable Energy. *Handbook for Handling, Storing, and Dispensing E85 and Other Ethanol-Gasoline Blends.* September 2013. http://www.afdc.energy.gov/uploads/publication/ethanol_handbook.pdf

[6] The mission of the international nonprofit National Fire Protection Association is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. The International Code Council is a membership association dedicated to building safety and fire prevention. The council develops the codes and standards used to construct residential and commercial buildings, including homes and schools.

Laboratories (UL) certification as the primary method for determining the compatibility of UST systems with EPA requirements. Some states also allow compatibility to be demonstrated in other ways, including through the manufacturer's approval or a professional engineering certification[7].

On July 15, 2015 EPA issued a final rule revising underground storage regulations. These changes establish Federal requirements that are similar to key portions of the Energy Policy Act of 2005 (EPAct); they also update the 1988 UST and state program approval (SPA) regulations. Changes to the regulations include:

- Adding secondary containment requirements for new and replaced tanks and piping;
- Adding operator training requirements;
- Adding periodic operation and maintenance requirements for UST systems;
- Addressing UST systems deferred in the 1988 UST regulation;
- Adding new release prevention and detection technologies;
- Updating codes of practice; making editorial corrections and technical amendments; and
- Updating state program approval requirements to incorporate these new changes.

With the tight deadline for this report, Stillwater has been unable to determine how this revision impacts the analysis and costs in this study

2.1.4 Converting stations to E15 and E85

Fueling Equipment - E85 stations require at least one storage tank and one dispenser devoted to selling the fuel. Both have minimum requirements to serve E85.[8]

Tanks - The vast majority of USTs being used for petroleum-based fuels can also be used for E85 after proper conversion. Analysis has shown that converting a midgrade tank is the most cost effective; however, many types of tanks have been converted including premium, diesel, kerosene, and redundant regular gasoline tanks.

Dispensers - Gasoline dispensers need to be converted or replaced to serve E85. The local authority having jurisdiction (AHJ), typically a fire marshal, must approve the dispenser system. The AHJ dictates what components need to be replaced for proper conversion or whether a new dispenser is needed. The AHJs typically require UL-certified components, but the lack of listed equipment has resulted in AHJs approving E85 dispensers through other methods. However, OSHA regulations require that retailers use equipment listed by a "nationally recognized testing laboratory" (i.e., UL) and retailers are required to comply with all applicable laws and regulations to be in compliance with tank insurance policies, state fund requirements, bank loan covenants, and to be considered not-liable under negligence theory for any accidents that occur with the tank. Therefore, AHJs will likely require UL-certified dispensers once they are available. The two primary manufacturers of the dispenser technology and blending equipment are Gilbarco of Greensboro, North Carolina, and Dresser-Wayne located in Austin, Texas.

[7] U.S. Government Accountability Office. Biofuels*: Challenges to the Transportation, Sale, and Use of Intermediate Ethanol Blends.* Jun 3, 2011. Publicly Released: Jul 8, 2011. http://www.gao.gov/products/GAO-11-513

[8] NREL. *Cost of Adding E85 Fueling Capability to Existing Gasoline Stations: NREL Survey and Literature Search.* March 2008. http://www.afdc.energy.gov/pdfs/42390.pdf

3 Analysis of E85 Service Station Infrastructure Capabilities

The purpose of this section is to validate service station infrastructure assumptions made in previously published reports by academics and economists, and demonstrate that there are no physical constraints limiting the sale of E85 through the service station network.

By way of definition, E85 is subject to the specification standard used by ASTM D5798 that is a blend of gasoline and ethanol containing 51 percent to 83 percent ethanol depending upon the geographical location and season, and in some instance a combination of both. (E85 is considered as a "nonpetroleum fuel" under EPA's definition since it contains 85 percent ethanol and only 15 percent gasoline). For formal government reporting purposes the U.S. Energy Information Administration (EIA) uses an average ethanol concentration of 74 percent. For the purposes of this analysis, we will use a factor of 0.665, which adjusts the 0.74 because every E85 gallon displaces 0.75 gallons of E10. 0.75 gallons of E10 contain 0.075 gallons of ethanol. The sale of a gallon of E85 results in an ethanol gain of 0.74 gallons of ethanol but the loss of the .075 gallons of ethanol from the E10 gasoline that was displaced. The net ethanol gained is 0.665 gallons. Research has found a variance in the number of verifiable or reported service stations dispensing E85 and therefore a firm volumetric amount, in gallons of actual sales to consumers, is subject to a range of estimates.

In evaluating the potential sales of E85 by year-end 2016, Stillwater will review three cases:

1. Assessment of the capabilities of the existing network of service stations providing E85 product to their customers;
2. The addition of a layer of incremental dispensers at existing service stations providing additional customers with access to E85;
3. The addition of E85 dispensers at E10 stations.

For any existing service station planning the introduction of E85 sales to their location, a compelling business case must exist and certain "table stakes" items must be present.

- Production of sufficient Flexible Fuel Vehicles (FFVs)
- Investment in new fuel dispensing infrastructure
- Pricing E85 to compete with E0 or E10 on an equivalent mile per gallon basis
- Commitment by motorists to use renewable fuels

All of these table stakes have been or can be met by the existing infrastructure in the E85 service station network. The existing E85 dispensing infrastructure on site can provide multiple times the average current sales volume without incremental capital cost.

3.1 The E85 Base Case Assumptions

According to the U.S. Department of Energy's (DOE) Alternative Fuels and Advanced Vehicles Data Center,[9] there are 2,949 service stations currently dispensing E85 fuel to consumers, for use in over 17.4 million FFVs on U.S. roadways[10]. The high-level ethanol blends are available in more than 40 states, with a concentration of stations in the Midwest; however, the number of E85 stations represent less than two percent of the nation's approximately 155,000 service stations. EPA estimates that the number of E85 stations at the end of 2014 was 3,000[11]. However, the Renewable Fuels Association (RFA) states that "3,349 stations were selling E85 as of summer 2014."[12] This analysis uses 3,000 E85 stations.

[9] DOE Alternative Fuels Data Center. *About the Alternative Fueling Station Data.* http://www.afdc.energy.gov/fuels/data_methods_stations.html
[10] Approximately 300 of these are stations for private fleets, while the remainder are public service stations
[11] EPA. *Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017; Proposed Rule.* June 10, 2015. http://www.gpo.gov/fdsys/pkg/FR-2015-06-10/pdf/2015-13956.pdf
[12] This would only increase the percentage of E85 stations to 2.2% nation-wide.

Competition between neighboring E85 service stations is less than robust when compared to the number of service stations providing fuel for light duty vehicles (LDVs). One measure used to determine the ability to increase the number and concentration of E85 service stations is "station density." The metric is the number of specified vehicles divided by the number of fueling stations. Therefore, the station density for LDVs would be 230 million vehicles divided by 155,000 stations or 1,484. While for E85, the station density (using the lower DOE numbers) 17.4 million vehicles divided by 3,000 stations or 5,800. The station density for E85 locations is nowhere near saturated when compared to LDVs.

3.2 Case 1: Incremental E85 Volume through Existing Infrastructure

Many media outlets and retail gasoline publications have consistently blamed the lackluster sale of E85 on primarily three causes:

- Disparate pricing between E10 and E85 based upon net energy content
- Lack of E85 service stations
- RIN prices are not high enough to drive infrastructure investment

For the purposes of this paper, which focuses primarily on the existing E85 infrastructure, Stillwater will not dwell on the first of these, the impact of mispriced E85, but assume competitive pricing with E10 (E85 is priced at a miles per gallon cost parity with E10) to test any dispensing constraints at service stations. The basis for the assumptions used to test the infrastructure limits were postulated by Bruce Babcock and Sebastien Pouliot in "Feasibility and Cost of Increasing U.S. Ethanol Consumption Beyond E10."[13] Prior to this research effort, studies and papers by other authors simply attempted to extrapolate potential E85 sales using linear models based upon E10 consumption rates. This analysis is off target, since FFVs are the only vehicles that can use E85 fuel. Babcock and Pouliot used detailed data extracts for the geographical distribution of FFVs across the U.S. down to the zip code level, and the corresponding data of existing E85 service stations with infrastructure already in place. Key to their study was the creation of a model used to "show how limits on the capacity of fuel stations to sell E85 affect demand and explore the potential future demand for E85 by increasing the number of fuel stations offering E85 and the number of flex vehicles."[14] As mentioned above, the existing infrastructure at E85 service stations is drastically underutilized. The fastest and cheapest means to increase sales of E85 is through these existing locations since Babcock demonstrated that the fleet of FFVs on the road today, can accommodate the increasing supply.

Stillwater set out to test how much ethanol could be feasibly dispensed from the existing E85 network infrastructure, which could drive increased competition between retailers, creating new opportunities for added infrastructure. The latest EIA estimate of gasoline consumption in the U.S. for 2014 is 137 billion gallons.[15]

After demonstrating the lack of any infrastructure constraints from the fuels or vehicle perspective, the Babcock paper explores deeper into the actual fueling operations, using data supplied in the State of Minnesota, Department of Commerce E85 Station Report.[16] Babcock's research revealed that an E85 service station in Minnesota sold almost 50,000 gallons in one month and he therefore assumed a maximum of 45,000 gallons of E85 sales per station in his model. That assumption was confirmed as reasonable when presented to industry representatives. Stillwater examined this assumption closely.

[13] Babcock, Bruce A., Pouliot. *Feasibility and Cost of Increasing U.S. Ethanol Consumption Beyond E10.* Iowa State University. January 2014. http://lib.dr.iastate.edu/card_policybriefs/7/
[14] http://www.sciencedirect.com/science/article/pii/S0140988314001558
[15] In 2014, about 136.78 billion gallons (or 3.26 billion barrels) of gasoline were consumed in the U.S., a daily average of about 374.74 million gallons (or 8.92 million barrels) - http://www.eia.gov/tools/faqs/faq.cfm?id=23&t=10
[16] Minnesota Department of Commerce. *2015 Minnesota E85 + Mid-Blends Station Report.* 2015. http://mn.gov/commerce/

While a typical service station is open 24 hours per day (usually set by contractual terms) the bulk of its fuel sales take place over a 12-hour period with very little taking place during the late evening or early morning hours. The question is can the typical service station physically dispense 45,000 monthly gallons of E85 without hitting any mechanical constraints? While it only marginally affects the feasibility review, we assume that daily sales are ratable through the 30-day month, requiring an average of 1,500 gallons of E85 sales per day.

When discussing the current E85 dispensers, this analysis assumes one E85 dispenser per station located on a fueling island allowing two vehicles access at the same time with one fueling hose on each side of the island. During the "prime" 12-hour window for retail gasoline sales, approximate 75 percent of fuels sales take place. In other words, under Babcock's assumptions, 33,750 gallons of E85 would be sold during this 12-hour window per month equates to 1,125 gallons of E85 per 12-hour window each day at a typical station or 93.75 gallons per hour per dispenser during peak times. This is equivalent to about eight customers per hour, four customers per side.

The first technical item to address is the actual "flow rate" of the dispenser. For safety reasons, the EPA has established a rule that limits the rate at which gasoline or methanol is pumped into motor vehicles to 10 gallons per minute.[17] While each dispenser has its own self-contained pumping mechanism, it is designed to be shared by both hoses attached to the dispenser, allowing one dispenser to fuel two vehicles simultaneously. While flow rates vary service station to station, and then by dispenser the guideline used by this exercise is a conservative flow rate of three gallons per minute, assuming two vehicles are using the dispenser at the same time.

The average volume of gasoline purchased per transaction (which may or may not completely fill the vehicle gasoline tank) is approximately 12 gallons, which at a flow rate of three gallons per minute would result in the average fueling not exceeding four minutes. Allowing time for the just fueled vehicle to leave the fueling island, and the next vehicle to situate at the dispenser may add an additional two minutes. Using an estimated six-minute fueling cycle per vehicle, each hose on the fuel dispenser could service 10 vehicles per hour, for a total of 20 vehicles per hour per dispenser.

Using the typical fueling volume of 12 gallons per transaction, a single E85 fueling dispenser with two hoses would therefore dispense 240 gallons of fuel during each of the "prime" hours of operations per day, which works out to 2,880 gallons during the entire peak window, 3,840 gallons total per day, and 115,200 gallons total per month. Using these conservative times and volumes for fueling, the actual maximum reasonable throughput is 2.5 times what is assumed in the principal Babcock analysis. It is even substantially more than alternative analysis in the Babcock paper, in which a throughput of 90,000 per station per month is assumed.

In summary, given Babcock's premise that existing E85 service stations were capable of dispensing 45,000 gallons per month of E85, 1.2 to 1.3 billion gallons of E85, containing about 1 billion gallons of ethanol, would be consumed.[18] Stillwater can now confirm the feasibility of this assumption used in the Babcock model. Taking this to the next step, the assumptions above related to dispensing capacity, would allow the existing E85 service station infrastructure to equal or even exceed the higher Babcock target of 90,000 gallons per month, which would allow 1.8 billion gallons of ethanol to be consumed.

3.3 Case 2: Adding Second E85 Dispensers to Existing E85 Stations

A rule of thumb in gasoline marketing has been a station that sells two million gallons of fuel per year requires four dispensers with two hoses each. Doing the math, the dispenser throughput is

[17] EPA. *Transportation and Air Quality*. http://www.epa.gov/oms

[18] Babcock, Bruce A., Pouliot. *Feasibility and Cost of Increasing U.S. Ethanol Consumption Beyond E10.* Iowa State University. January 2014. http://lib.dr.iastate.edu/card_policybriefs/7/

about 42,000 gallons per month for a system where there is minimal customer waiting time. This throughput rate is close to the 45,000-gallon per month selected by Babcock, which the analysis above confirmed as eminently feasible, but by no means is this an upper limit to dispenser throughput. Indeed, the analysis above showed that throughput could reach twice that level or more. Nonetheless, 45,000 gallons per month is a conservative throughput to minimize customer waiting time and to provide a small cushion that can be used to handle future growth in station sales. For this case, Babcock's 45,000 gallons per month will be used.

In their latest RFS proposal, EPA states that there are around 3,000 existing E85 stations. If these 3,000 stations dispense 45,000 gallons per month each, the volume of E85 consumed could be 1.62 bgy, with an ethanol content of 1.08 bgy as shown in Table 2. Table 3 shows that at a dispenser throughput of 90,000 gallons per month 3.24 bgy of E85 can be dispensed with an ethanol volume of 2.15 bgy.

Table 2. Existing E85 stations Total Volumes with 45,000 gpm Dispenser Throughput

		Throughput	E85	Ethanol
	STATIONS	Gallon/month	BGY	BGY
Existing E85 stations w/existing dispensers	3,000	45,000	1.62	1.08

Table 3. Existing E85 stations Total Volumes with 90,000 gpm Dispenser Throughput

		Throughput	E85	Ethanol
	STATIONS	Gallon/month	BGY	BGY
Existing E85 stations w/existing dispensers	3,000	90,000	3.24	2.15

If E85 stations want to reduce potential customer wait times, one alternative way to increase a station's throughput is to add more E85 dispensers. The most cost-effective place to add these dispensers is in the existing E85 stations. The first preference would be to add the new E85 dispensers during that time when the station has decided to replace an old E10 dispenser. E85 stations generally have their dispensers replaced every seven years[19]. Given that rate, about 429 E10 dispensers at E85 stations will be replaced in 2016 in the normal course. If they were replaced with second E85 dispensers, an additional 0.12 bgy of E85, which is 0.08 bgy of ethanol could be moved. These stations would only be paying the difference in cost between the E10 dispenser and the E85 dispenser, which would be $5,000.[20]

The next incremental ethanol would be added by installing second dispensers at the existing E85 stations that are not planning to replace their dispensers in 2016. It is estimated that, after converting 429 stations when those stations are already replacing dispensers, there will only be 2,200[21] E85 stations that are suitable for the addition of a second dispenser. Assuming that these 2,200 dispensers could be installed in a ratable manner over 2016, these dispensers could move an additional 0.54 bgy of E85 during 2016, which equates to 0.36 bgy of ethanol. The cost for this increment of E85 sales is the cost of a new E85 dispenser, which is $15,000.

A ratable addition of this many dispensers could easily be accomplished over 2016. It bears noting that every year, one-seventh of the nation's gasoline stations – or roughly 22,140 stations – are upgrading their dispensers. So this is a very small increase in the amount of infrastructure work that already happens as a matter of course. Moreover, with sufficient financial incentive, these stations will have ample time beginning in December 2015 to make this limited upgrade over the course of 2016.

[19] Stillwater estimate. See Section 5.5.1 for details
[20] $15,000 for the E85 dispenser minus $10,000 for the E10 dispenser
[21] Private E85 stations were not deemed to be good candidates for conversion

Table 4 summarizes these three potential courses of action. Table 5 calculates the costs for installing these dispensers. As Table 4 shows, this case was unable to reach the 1.84 bgy of ethanol target. Only 1.52 bgy of ethanol was reached in 2.28 bgy of E85. The total cost to deliver this 1.52 bgy of ethanol above the E10 blendwall for this case is $35.1 million. Because these stations already carry E85, there are no additional underground tank systems or piping systems changes required with the addition of second dispensers. It should be noted that this analysis conservatively assumed that current E85 stations only have a single E85 dispenser and only had a conservative throughput of 45,000 gallons per month. To the degree that E85 stations have more than one dispenser or they can get a larger throughput volume, the number of second E85 dispensers can be reduced or larger volume of E85 can be supplied than is indicated in this analysis.

The Department of Agriculture is in the process of implementing a program that could potentially pay the stations for up to 75 percent of the dispenser costs.[22] Based on this incentive, the costs to station owners in Table 5 could be reduced by up to $11 million.

Table 4. Total E85 and Ethanol Volumes Above E10 Blendwall from Additional E85 Dispensers at Existing E85 Stations

		Throughput		E85	Ethanol
	STATIONS	Gallon/month		BGY	BGY
Existing E85 stations w/existing dispensers	3,000	45,000		1.62	1.08
2nd E85Dispenserwhen replacing dispensers	429	45,000		0.12	0.08
Additional 2nd E85 Dispensers	2,200	45,000		0.54	0.36
Total E85 and Ethanol Volumes Gained				**2.28**	**1.52**

Table 5. Cost of Adding Additional E85 Dispensers at Existing E85 Stations

			Subtotal
	STATIONS	Cost	$ million
Existing E85 stations w/existing dispensers	3,000	$ -	$ -
2nd E85Dispenser when replacing dispensers	429	$ 5,000	$ 2.1
Additional 2nd E85 Dispensers	2,200	$ 15,000	$ 33.0
Total Cost			$ 35.1

3.4 Case 3: Adding E85 Dispensers to Existing E10 Stations

Rather than installing 2,200 second dispensers at existing E85 stations, the same E85 volume can also be gained by installing E85 dispensers in existing E10-only stations. About 22,000 E10-only stations will be replacing dispensers in 2016 as part of routine dispenser replacement and station upgrade. These stations are ideal candidates to replace one of their E10 dispensers with an E85 dispenser. With the movement to E10, most E10 stations have tanks that are capable of holding E85. However, retailers may have to contact their tank supplier to get a letter certifying this.

Using a report from the National Renewable Energy Laboratory (NREL) "E85 Retail Business Case"[23] there are three common means for an existing service station to introduce E85 fuels at its dispensers:

[22] Notice of Funds Availability (NOFA); Biofuel Infrastructure Partnership (BIP) Grants to States; Federal Register 34363 Vol. 80, No. 115 Tuesday, June 16, 2015
[23] Johnson, C. and Melendez, M. *E85 Retail Business Case: When and Why to Sell E85*. NREL. December 2007. http://www.afdc.energy.gov/pdfs/41590.pdf

1. Mid-grade conversion - This scenario calls for the retailer to clean an existing tank and refill it with E85 after replacing or retrofitting non-compatible dispensers or equipment with compatible ones. This applies to cases where stations have a third tank for mid-grade that can be replaced by a blending valve (for regular and premium to make mid-grade), cases where stations have an extra regular grade tank, or cases where diesel is replaced because the sales are deemed negligible.
2. New tank - The retailer installs a new underground storage tank and retrofits or replaces dispensers, pumps, and piping with E85-compatible components. In this case, the retailer retains the sales of regular and premium fuel.
3. Premium conversion - The retailer fills the premium-grade tank with E85 after cleaning it and replacing non-compatible material and components. This case applies to stations that blend their mid-grade rather than draw it from a designated mid-grade tank, so the retailer can no longer offer either mid-grade or premium-grade gasoline once the tank is converted.[24]

All of the existing E85 service stations have implemented one of the above conversion plans. Method 1 will be assumed for this case. Since the addition of E85 to an E10 station requires a tank for E85, only half of the 22,000 stations would be able to make this addition without having to install a new tank. If these 11,000 candidate E10 stations are spread evenly throughout 2016, about 900 per month could be converted into E85 stations. In order to meet the 1.84 target, however, only about 4,150 stations must be converted to E85 during 2016. This translates into a conversion rate of about 345 candidate stations per month during 2016. This analysis assumes that December 2015 will be taken up with engineering, hiring contractors, ordering equipment and dispensers and that throughput through the first dispensers installed begins February 1, 2016. . Again, particularly with adequate financial incentive, this timeframe is reasonable, particularly since it envisions some stations upgrading late in 2016 while others upgrade more quickly. The phasing of the 345 per month conversions during 2016 results in increased E85 volumes of 2.76 bgy and ethanol volumes of 1.84 bgy above the E10 blendwall. The National Renewable Energy Laboratory (NREL) has listed prices for converting an existing tank to E85 and installing a new E85 dispenser as $30,000.[25] The total cost for this case is $127 million. Tables 6 and 7 show the volumes and costs, respectively, for adding E85 dispensers to E10 stations.

Table 6. Total E85 and Ethanol Volumes Above E10 Blendwall from Adding E85 Dispensers at E10 Stations

	STATIONS	Throughput Gallon/month		E85 BGY	Ethanol BGY
Existing E85 stations w/existing dispensers	3,000	45,000		1.62	1.08
2nd E85 Dispenser when replacing dispensers	429	45,000		0.12	0.08
Add E85 Dispensers to E10 stations	4150	45,000		1.03	0.68
Total E85 and Ethanol Volumes Gained				**2.76**	**1.84**

[24] DOE EERE. *Clean Cities – Building Partnerships to Reduce Petroleum Use in Transportation.* http://www1.eere.energy.gov/cleancities/

[25] Moriarty, K., Johnson, C., Sears, T. and Bergeron, P. *E85 Dispenser Study*. NREL. December 2009. http://www.afdc.energy.gov/pdfs/47172.pdf

Table 7. Cost of Adding E85 Dispensers at E10 Stations

	STATIONS	Cost	Subtotal $ million
Existing E85 stations w/existing dispensers	3,000	$ -	$ -
2nd E85Dispenser when replacing dispensers	429	$ 5,000	$ 2.1
Add E85 Dispensers to E10 stations	4,150	$30,000	$ 124.5
Total Cost			$ 126.6

3.5 Case 4: Adding Second E85 Dispenser to Existing E85 Stations and Adding E85 Dispensers to E10 Stations

Case 2 fails to reach the targeted level of ethanol increase because there are not enough suitable existing E85 stations to install the required number of dispensers. Case 4 remedies this by supplementing Case 2 with additional E85 dispensers added to E10 stations to reach the targeted ethanol volume. Tables 8 and 9 present the volumes and costs for Case 4. In this case the target of 1.84 bgy ethanol is reached on E85 volumes of 2.76 bgy. 1,950 more E85 dispensers need to be installed in E10 stations to achieve this result. The total cost for this case was $93.6 million.

Table 8. Total E85 and Ethanol Volumes Above E10 Blendwall from Modifying Case 2 by Adding E85 Dispensers at E10 Stations

	STATIONS	Throughput GPM		E85 BGY	Ethanol BGY
Existing E85 stations w/existing dispensers	3,000	45000		1.62	1.08
2nd E85Dispenser when replacing dispensers	429	45000		0.12	0.08
Additional 2nd E85 Dispensers	2200	45000		0.54	0.36
Add E85 Dispensers to E10 stations	1950	45000		0.48	0.32
Total E85 and Ethanol Volumes Gained				**2.76**	**1.84**

Table 9. Cost of Modifying Case 2 by Adding E85 Dispensers at E10 Stations

	STATIONS	Cost	Subtotal $ million
Existing E85 stations w/existing dispensers	3,000	$ -	$ -
2nd E85Dispenser when replacing dispensers	429	$ 5,000	$ 2.1
Additional 2nd E85 Dispensers	2,200	$ 15,000	$ 33.0
Add E85 Dispensers to E10 stations	1,950	$ 30,000	$ 58.5
Total Cost			$ 93.6

Both cases 3 and 4 look at the minimum number of required conversions to reach the target level. In fact, there is already much E85 dispenser installation activity taking place in 2015 and it is likely to continue in 2016. For example, Speedway, one of the largest national convenience store chains, has announced that they are installing E85 dispensers in every new build station and most rebuilt stations. They have told Stillwater that their target is 275 E85 pumps in both 2015 and 2016[26]. This will add 0.209 bgy E85 and 0.14 bgy of ethanol in 2016 from the dispensers installed in 2015 and half that volume in 2016 if the 275 dispensers are installed evenly throughout the year. Thus, just Speedway's additional E85 stations will add 0.209 bgy of E85 which contains 0.21 bgy ethanol and this eliminates the need to add more than 500 of the second E85 dispensers required in this case. A number of other companies, such as Kum & Go, Kwik Trip, Thorntons, Spinx, Rebel Oil, Break Time (MFA), MFA Oil, Meijer Gas, Super Pantry, Bosselman's Pump & Pantry, Kroger, Murphy, Petro Serve USA and Road Ranger all have

[26] Conversation between Speedway and Stillwater on July 13, 2015.

programs to significantly increase the number of E85 stations. These programs are such that E85 will be offered at 18 percent to more than 25 percent of each company's stations. Stillwater has been unable to quantify the number of new E85 stations but each one will reduce the number of conversions identified above.

3.6 Transporting an Additional 1.84 bgy of Ethanol

While the distribution system must move four gallons of E85 for every three gallons of gasoline, most of the E85 will move from local ethanol production facilities or ethanol tanking facilities to the stations by truck. While trucking assets will require some redeployment (from product terminals to ethanol plants or ethanol storage facilities) this should not be a constraint on the distribution system. Rebalancing these truck transportation requirements results in little change to the overall number of trucks.

The station tankage for E85 should also not be a concern. Even for small stations, the station's largest tank is sized to move about 85 percent of the volume (regular gasoline) through the two dispensers in a day. If this becomes tight, the station will simply move to twice a day deliveries of E85.

The distribution of ethanol for E85 is very different from the ethanol movements required for E15. E15 in this report will be blended at gasoline product terminals spread throughout the country. Railroads, barges and trucks will move the ethanol for E15. E85 is primarily blended at ethanol plants in the Midwest and mostly trucked to E85 stations that are close to the ethanol production facilities. Since 1.84 bgy of ethanol represents less than a 15 percent increase in ethanol volumes, it will represent increased production at existing or new ethanol plants but will have little impact on the gasoline or ethanol distribution system.

3.7 Vehicle Impacts of an Additional 1.84 bgy of ethanol or 2.76 bgy of E85

Babcock's article referred to above effectively demonstrates how to get E85 to the FFVs that can use it. However, this report would be remiss if it did not examine the impact on the FFV fleet from the addition of the targeted 2.76 bgy of E85. As noted earlier, the current FFV fleet uses very little E85 as a percentage of the total fuel they consume. The 2.76 bgy of E85 is a significant increase in E85 volumes. However, this increase can still be easily consumed by the 17.4 million[27] FFVs currently on the highway. In fact, this amounts to about 160 gallons per year per vehicle or less than one fourth of the FFVs annual fuel requirements of 666 gallons[28]. Babcock's study found that 8 million FFVs are located within 10 miles of an E85 station. 8 million FFVs have an estimated E85 demand of 5.3 bgy. So about a half of the FFVs located within a reasonable distance of an E85 station would have to use E85 throughout 2016 to consume the 2.76 bgy of E85 identified in this study.

3.8 E85 Summary

It is possible for the fuels industry to blend enough ethanol into E85 for sale through existing E85 stations to exceed EPA's proposed 2016 RFS ethanol increase of 0.84 bgy by more than 1.0 bgy. This target can be reached by increasing volume through the existing E85 dispensers. Or if EPA is looking for a more conservative approach, it can be accomplished by adding additional dispensers to existing stations at a relatively low cost. In addition, many companies are adding large numbers of new E85 stations. The industry is already on a path to achieving this growth and very well could reach the necessary expansion if given appropriate economic incentives.

[27] [27] DOE Alternative Fuels Data Center. *About the Alternative Fueling Station Data.*
[28] 500 gallons divided by 0.75(the relative energy content of E85)

4 Analysis of E15 Service Station Potential Capabilities

4.1 Limitations on E15 blending

4.1.1 1 psi RVP Waiver

When EPA granted Growth Energy's petition on E15, EPA did not grant E15 the same 1 psi RVP waiver consideration during ozone seasons (June 1 to September 15) that E10 receives. When ethanol is blended with gasoline or gasoline blendstock (BOB), it causes the vapor pressure of the mixture to be higher than that of the original gasoline or BOB. At 10 percent ethanol, 90 percent gasoline the vapor pressure increase is about 1 psi. In the past, when ethanol was blended at 10 percent with finished gasoline, a waiver of this 1 psi increase was needed, to allow the 10 percent ethanol blend to meet gasoline specifications. In the rulemaking on the E15 petition,[29] EPA stated that it does not have the authority to grant or take away the 1 psi RVP allowance. The Clean Air Act gives the state governors the authority to revoke the 1 psi RVP waiver.

Without the 1 psi RVP waiver, E15 would need a BOB with a lower RVP than the BOB typically used for E10 blending. This different BOB requirement would force refiners to produce and store an additional grade of gasoline (two if a premium E15 is desired) and the distribution system and terminals to have to segregate, handle, and store one or two extra grades. Tankage constraints at refineries, pipelines, and terminals limit the ability of most facilities to handle this additional grade(s).

The demand volume of the E15 BOB's will play a critical role in driving these facilities to convert E10 BOB tankage to E15 BOB tankage. In 2010-2011, Colonial Pipeline and the entire Southeast distribution system, plus the supplying refineries converted from conventional gasoline to E10 BOB's when the RFS forced their customers to request E10. (Transition from finished gasoline to E10 BOB took about two years.)

4.1.2 Many State and Municipal Gasoline Specifications Do Not Allow E15

Many states have a maximum limit of 10 percent by volume ethanol in gasoline. E15 does not have an approved set of ASTM or National Institute of Standards and Technology (NIST) specifications. Since many states adopt ASTM or NIST standards in their entirety, this limits E15 blends. These specifications include T50, Vapor Lock (V/L), RVP, as well as ethanol content. (Iowa has none of these limits, for example.) Many states use ASTM standards, which do not incorporate E15.

In addition to 10 percent by volume ethanol state limits, most major cities are or have been ozone non-attainment areas. Allowable fuels in these areas are defined by State Implementation Plans (SIPs). The oil industry has asserted that some of these SIPs might not allow E15 and ethanol volumes above 10 percent in gasoline. Revised SIPs must be approved by the state and EPA[30].

4.1.3 Station Hardware Does Not Support E15

Station hardware-dispenser, tankage, piping and support systems are not E15 compatible at most stations. E15 equipment does not have UL certification, requires Fire Marshal approval and needs to meet EPA underground storage tank requirements. Fire Marshal requirements can vary widely and the Fire Marshal is very important to the process to the certification process. In addition, many stations are contractually prohibited from allowing E15 to be sold under the canopy.

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[29] http://www.gpo.gov/fdsys/pkg/FR-2011-01-26/pdf/2011-1646.pdf

[30] DOE Office of Policy and International Affairs and Office of Transportation and Air Quality. *EPAct Section 1541(c) Boutique Fuels Report to Congress.* December 2006. http://www.epa.gov/otaq/boutique/420r06901.pdf

4.1.4 Expansion of the Ethanol Distribution System May Be Required

The ethanol distribution system must be expanded to handle 1.84 bgy of additional ethanol beyond the E10 blendwall. A 14 percent increase may require additional rail cars. Truck deliveries from the railhead to the terminals will increase truck traffic into the terminals, potentially creating bottlenecks at the truck rack. There may be constraints at rail facilities (hubs) with increased rail traffic.

4.2 Potential Solutions to Avoid E15 Constraints

While the list of E15 limitations cited above looks formidable, there are some potential solutions around E15 constraints. In order to avoid the problem with the lack of a 1 psi RVP waiver for E15 it is possible to:

- Blend E15 in the non-ozone season.
- Blend 15 percent ethanol into RFG. The 1 psi RVP waiver does not apply to RFG, which has a complex model VOC calculation. EPA has changed the RFG regulations to allow 15 percent ethanol to be blended into any RBOB.[31]
- Blend 15 percent ethanol with a low RVP (7.8 or 7.0) BOB. The resulting RVP would be below the 9.0 psi RVP maximum limit for conventional gasoline during the ozone season.

To avoid state 10 percent ethanol caps and other restrictive specifications, retailers can sell E15 in states that do not have the 10 percent ethanol volume limit and other gasoline specification restrictions. This represents about 20 percent of the national gasoline pool. On a longer-term basis efforts could be undertaken to get state 10 percent caps and other restrictions lifted.

For this study, even if SIPs (State Implementation Plans) exist, as discussed above in 4.1.2, they would not be a problem. SIPs are required by every current or past ozone non-attainment area. These plans demonstrate to EPA how the area in question will come into attainment of the ozone National Ambient Air Quality Standards (NAAQS). Generally, these plans include fuel changes from conventional gasoline to low RVP gasolines (7.8 RVP or 7.0 RVP) or RFG. Since EPA has determined that RFG with 15 percent ethanol meets the same emissions criteria as RFG with 10 percent ethanol, SIPs that require RFG will not have to be changed. There are also SIPs that require low RVP gasolines for ozone non-attainment areas. In this study, E15, other than RFG, is only introduced into attainment areas and mostly during the non-ozone season. SIPs do not apply in ozone attainment areas.

While most current station hardware is not E15 compatible, the steps that need to be taken to make a station E15 compatible have been defined. The detailed analysis below identifies all station hardware that needs to be modified or replaced to make the station E15 compatible. The costs are identified and the timing requirements examined. Stations must work with Fire Marshalls, vendors, and EPA. It should be noted that under special circumstances, these approvers may be inclined to grant short term variances or waivers.

It is true that most stations cannot put E15 dispensers under their canopies. However to work around this, initial E15 efforts should concentrate on independent marketers such as Costco, Racetrac, Safeway, Sheets, Big Boxes, WaWa, etc. Larger more integrated fuel companies will change their stance when E15 becomes more prevalent in the marketplace.

Moving 1.84 bgy of ethanol beyond the E10 blendwall to the point where it can be blended into gasoline will require some expansion of the ethanol distribution facilities but these will not be major changes. These changes represent a less than 15 percent increase in ethanol movements and storage and they will occur over the period of a year. Most tank turn calculations are done in a conservative manner with at least a 15-20 percent cushion and so product terminals and ethanol tankage terminals will adapt easily. Terminals that are tight today such as Doraville, Carson City, etc. need to be identified as quickly as possible, so that they can consider how to

[31] Email between EPA and Stillwater dated July 8, 2015

expand their capabilities. Neither of these facilities are included in the study. With this large new volume of ethanol, new unit train opportunities should be explored.

Product terminals do not require any modifications to blend E15. They have automated blending equipment that can be quickly programmed for different blends of ethanol and gasoline.

5 Routes to E15 Sales

5.1 E15 Sales in States without E15 restrictions

Even though the EPA has approved the use of E15 there are still many constraints that hinder its adoption. The largest constraints are state fuel regulations that impose their own requirements on transportation fuels based on ASTM or NIST Handbook 130 standards. Many of these regulations would require a change in state legislation to permit E15 sales. These regulations include:

1. **Blending Restrictions and Blending Caps –** Many states have blending restrictions or caps set at E10. E10 blending caps in state fuel specifications, biofuel mandates, and tax incentives specify specific concentrations of ethanol to comply with the mandate or tax incentives. States that have adopted ethanol mandates have generally specified E10 as part of the mandate, effectively creating a blend cap.
2. **Reid Vapor Pressure Requirements –** In addition to the federal RVP exemption for E10, many states have adopted their own RVP limits tied directly to E10. There are two types of RVP waivers; Summer RVP, which is in effect only during the summer months, and general RVP waivers, which provide for exemptions for specific gasoline blends during non-summer months or on a year-round basis.
3. **T50 Minimum and Vapor Lock Protection Offsets –** Many states have adopted allowances for offsets for T50 minimum distillation temperatures and vapor lock protection that apply to ethanol blends of up to E10.

Table 10 lists the states and the various state fuel specifications that prevent the use of E15.

Table 10. Summary of Identified State Changes Required for E10+[32]

	Changes Required for E10+						% of Gasoline Sales	Ozone NA Areas
State	Blend Cap	Summer RVP	RVP	Vapor Lock	T50 Offset	Other		
Alabama			X	X	X		1.90	
Alaska							0.20	
Arizona	X		X			X	2.08	X
Arkansas	X		X	X	X		1.02	X
California	X					X	11.33	X
Colorado			X				1.55	X
Connecticut	X						1.13	X
Delaware	X						0.33	X
District of Columbia							0.09	X
Florida	X		X	X	X		6.16	
Georgia		X		X	X		3.59	X
Hawaii	X						0.33	
Idaho							0.47	
Illinois			X	X	X		3.68	X
Indiana		X					2.22	X
Iowa							1.22	X
Kansas		X					0.93	X
Kentucky		X		X	X		1.60	X
Louisiana							1.61	X
Maine	X		X	X	X		0.50	X
Maryland			X				1.96	X
Massachusetts							2.10	X
Michigan		X		X	X		3.43	X

[32] Sierra Research, Inc. *Identification and Review of State/Federal Legislative and Regulatory Changes Required for the Introduction of New Transportation Fuels – Prepared for the American Petroleum Institute.* August 4, 2010.

State	Changes Required for E10+						% of Gasoline Sales	Ozone NA Areas
	Blend Cap	Summer RVP	RVP	Vapor Lock	T50 Offset	Other		
Minnesota							1.87	X
Mississippi		X		X	X		1.20	X
Missouri	X		X		X		2.31	
Montana	X						0.35	
Nebraska	X						0.59	
Nevada	X		X	X			0.85	X
New Hampshire	X		X	X	X		0.53	X
New Jersey							3.16	X
New Mexico							0.67	
New York	X						4.12	X
North Carolina		X		X	X		3.17	X
North Dakota	X	X					0.24	
Ohio							3.67	X
Oklahoma	X						1.32	
Oregon	X						1.11	
Pennsylvania							3.69	X
Rhode Island							0.29	X
South Carolina							1.83	X
South Dakota							0.29	
Tennessee	X	X		X	X		2.23	X
Texas							8.61	X
Tennessee	X	X		X	X		2.23	X
Texas							8.61	X
Utah	X						0.77	
Vermont							0.25	
Virginia	X		X	X	X		2.95	X
Washington	X		X	X	X		1.95	
West Virginia	X		X	X	X		0.60	
Wisconsin	X	X					1.82	X
Wyoming		X					0.23	

One solution to the state fuel specification limitations is to sell E15 only in those states that do not have specifications that prevent the use of E15. Table 11 lists these states and includes EIA's 2014 estimates of conventional gasoline and RFG demands for each of these states.

Table 11. Potential E15 Gasoline by State (Billion Gallons per Year)[33]

STATE	Conventional Gasoline	RFG	Total
	BGY	BGY	BGY
D.C.		0.10	0.10
Idaho	0.70	0.00	0.70
Iowa	1.65	0.00	1.65
Louisiana	2.29	0.00	2.29
Massachusetts	0.00	2.75	2.75
Minnesota	2.53	0.00	2.53
New Jersey	0.00	3.98	3.98
New Mexico	0.94	0.00	0.94
Ohio	4.95	0.00	4.95
Pennsylvania	3.67	1.34	5.01
Rhode Island	0.00	0.36	0.36
South Carolina	2.68	0.00	2.68
South Dakota	0.44	0.00	0.44
Texas	7.83	4.87	12.70
Vermont	0.32	0.00	0.32
	0.00	0.00	0.00
TOTAL	28.00	13.41	41.41
Percentage of National Gasoline Demand	20.4%	9.8%	30.2%

5.2 E15 in RFG Sales

The next largest constraint on E15 is the lack of the 1 psi RVP waiver during the ozone season. This constraint does not impact RFG and thus the RFG volumes indicated in Table 11 can potentially be sold year round in both ozone and non-ozone seasons. This 13.41 bgy if converted from RFGE10 to RFGE15 represents an additional 0.67 bgy ethanol.

5.2.1 E15 Sales Outside of the Summer Ozone Season

The conventional gasoline listed in Table 11 can only be blended with 15 percent ethanol outside of the summer ozone season. The ozone season extends from June 1 to Sept 15. For purposes of this analysis, it will be assumed that the month of May will be required to transition station gasoline tanks from E15 to E10. Thus E15 can only be blended seven and a half months out of each year. This reduces the potential E15 conventional gasoline volumes from 28.27 to 17.67 bgy and the conversion of this volume from E10 to E15 represents an additional 0.88 bgy of ethanol.

[33] EIA. *Table F3: Motor Gasoline Consumption, Price, and Expenditure Estimates, 2013. http://www.eia.gov/state/seds/sep_fuel/html/pdf/fuel_mg.pdf*

5.3 Blending E15 with Low RVP BOB

Another way to solve the 1 psi RVP waiver problem for E15 is to blend 15 percent ethanol into 7.8 RVP gasoline BOB and sell it in areas that have a 9.0 RVP requirement. This can be done in areas that are in close proximity to 7.8 RVP areas. The stations would receive 7.8 RVP gasoline from the terminal blended with 15 percent ethanol. The RVP of the resulting blend should be around 8.6 RVP well below the 9.0 max requirement. Figure 4 depicts the use of specialty summer gasolines by county in the U.S. By looking at each of the states in Table 11 and determining if there low RVP gasoline (7.8 or 7.0 RVP) close by, candidate opportunities can be identified. Of the states listed in Table 11, Iowa, Louisiana, Pennsylvania, Ohio, South Carolina, and Texas have some areas that meet these criteria. Southeastern areas of Iowa can get 7.8 RVP gasoline from terminals in the Kansas City area. In Louisiana, there are several Louisiana terminals to choose from. In Pennsylvania, the Pittsburgh area requires 7.8 RVP gasoline. Gasoline stations in counties outside of the 7.8 RVP areas could pull the 7.8 RVP gasoline from terminals that supply the 7.8 RVP area. The northwestern area of Ohio has access to 7.0 RVP gasoline in the Detroit area terminals and eastern Ohio could get 7.8 RVP gasoline from Pittsburgh terminals. In South Carolina stations close to the Charlotte, NC terminals could get 7.8 RVP E10 gasoline blended with 15 percent ethanol and still meet the 9.0 max RVP specification. In Texas, the eastern half of the state requires 7.8 RVP gasoline. Gasoline stations just west of this 7.8 RVP area could get their gasoline from terminals inside of the 7.8 areas.

It is estimated that the combined gasoline demand of these areas would be about 3.14 bgy and would represent an additional ethanol volume of 0.157 bgy ethanol. This estimate assumes that 10 percent of each state's conventional gasoline demand could be supplied from 7.8 RVP terminals. The exceptions to this are a five percent rate for Iowa and a 50 percent rate for Louisiana. These volumes are shown in Table 12. Note that these stations would have higher transportation costs for getting their low RVP gasoline and these costs would be roughly about 1-2 cents per gallon (cpg). Since these E15 sales would occur during the ozone season plus the transition month, they only take place for 4.5 months out of the year. Adjusting for this portion of the year reduces the E15 volume to 1.18 bgy which represents 0.059 bgy of ethanol. The stations making ozone season sales have no station conversion costs, since these stations were already modified to handle the non-ozone season E10 to E15 conversion.

Since these volumes are relatively low, the increased supply of low RVP BOBs to the terminals of interest should be adequate.

Figure 4. Summer Gasoline Grades in the U.S. by Country

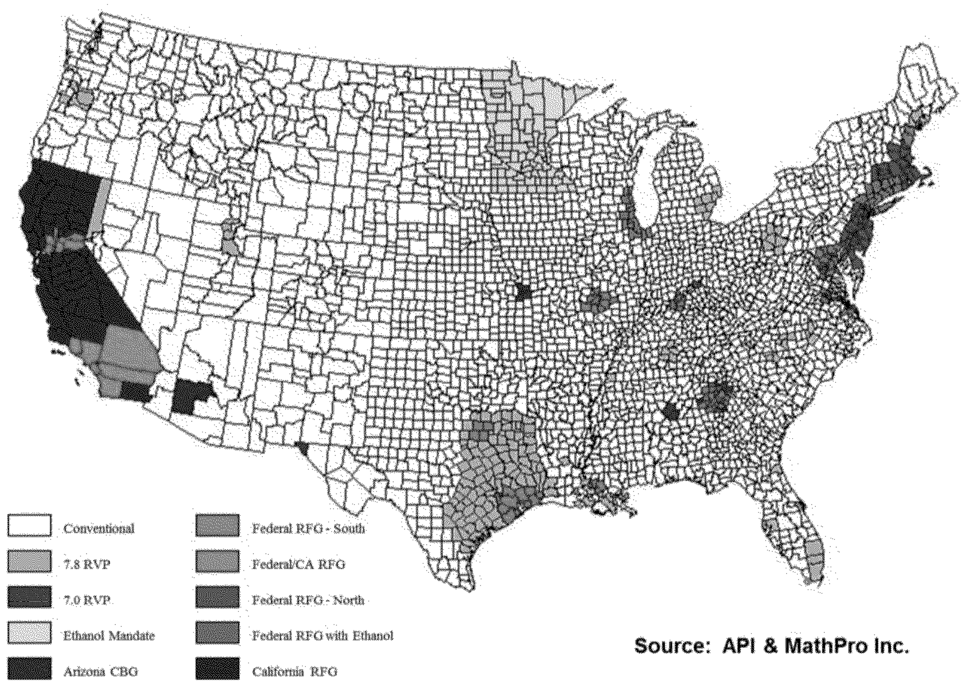

Table 12. Volume Estimates of E15 that could be Blended with Low RVP BOB

State	E15 Volume (bgy)
Iowa	0.08
Louisiana	1.14
Ohio	0.50
Pennsylvania	0.37
South Carolina	0.27
Texas	0.78
Total	**3.14**
Ethanol	**0.16**

5.3.1 Cumulative Results of Three Courses of Action

Table 13 shows the total for these three routes for E15 blending described above. The year round conversion of RFG to RFGE15, the winter conversion of E10 to E15 and the movement of 7.8 RVP gasoline into 9.0 RVP areas in the states without E15 restrictions, results in total potential E15 volumes of 32.09 bgy, which represents additional ethanol volumes of 1.60 bgy. This volume represents 23 percent of national gasoline demand and 34,970 of the nation's 155,000 gasoline stations.

Table 13. Total Potential E15 Sales (bgy)[34]

		Annual Volume			Jan 2016 to end 2016	
		E15	Ethanol		E15	Ethanol
RFGE10 to RFGE15		13.41	0.67		6.70	0.34
Non-Ozone E10 to E15		17.50	0.88		8.75	0.44
7.8 RVp to 9.0		1.18	0.06		0.59	0.03
Total		32.09	1.60		16.04	0.80
% of national gasoline		23%			12%	
	E15 Stations	34970				

5.3.2 Cumulative Results Adjusted for 11 Percent E10 Sales

Since 11 percent[35] of the U.S. vehicle fleet cannot use E15, it is assumed that 11 percent of the volumes in Table 14 should be maintained as E10 to fuel this portion of the fleet. Table 14 has the E15 volumes adjusted downward by 89 percent to reflect the gasoline volumes that need to remain E10.

Table 14. Total Potential E15 Sales Adjusted to Keep 11 percent of Sales E10[36]

		Annual Volume			Jan 2016 to end 2016	
		Adjusted for E10 demand			Adjusted for E10 demand	
		E15	Ethanol		E15	Ethanol
RFGE10 to RFGE15		11.93	0.60		5.97	0.30
Non-Ozone E10 to E15		15.58	0.78		7.79	0.39
7.8 RVp to 9.0		1.05	0.05		0.52	0.03
Total		28.56	1.43		14.28	0.71
% of national gasoline		21%			10%	
	E15 Stations	31123				

5.4 Adjusted E15 Sales Volumes Based on Station Dispenser Replacement Schedule

Stations replace and upgrade their dispenser hardware roughly every seven years. This represents 22,140 stations per year. The number of stations identified for conversion in Table 14 is 31,123. Thus during 2016, we would have to convert about 40 percent more stations than in a normal year. This might seem aggressive but there would be a significant financial driver in place, therefore Stillwater believes this is feasible. Note that stations converting to E15 are likely to outbid stations that are just routinely replacing their dispensers for the E15 conversion kits. They will have an economic incentive while the routine stations will just delay their replacements for a year.

Stillwater expects that the first month, December 2015, will be occupied by lining up engineering resources, hiring installation contractors and ordering replacement equipment and kits. It is necessary that the Fire Marshall be consulted and approval obtained. It is also necessary that EPA, OSHA, and state agencies be informed. Thus Stillwater assumes that no conversions are completed in 2015 and that the conversions are spread evenly over the appropriate time periods for the fuels being produced in 2016. While the first conversions may proceed slowly, it is expected that all the parties involved will quickly become proficient so that most of the

[34] The right hand columns, Jan 2016 to end 2016 reflect that the installations are phased in over 2016.
[35] Darlington, T.L. *Analysis of Fleet Percentage of 2001+ Model Year Group In Calendar Years 2014, 2015, and 2016*. July 12, 2015.
[36] The right hand columns, Jan 2016 to end 2016 reflect that the installations are phased in over 2016.

conversions will be accomplished in a cookie cutter fashion. On average, Stillwater believes that this station conversion rate is a little optimistic but could get accomplished by parties with the right financial motivation. Note that some station owners may start this process early hoping to get a jump on their competitors.

While stations with upgraded dispensers in the first month, would have 11 months of E15 sales, the stations converted during the last month of 2016 would have very little E15 sales. Assuming that the station conversions are spread evenly over the applicable timeframe for each fuel, the potential E15 sales over this time would be 14.35 bgy, representing an additional 0.71 bgy of ethanol over E10. The two right columns of Table 13 and 14 show the prorated volumes over the 12 months of the 2016 RFS rule. Note that none of this E15 volume is sold during December 2015, so the totals truly represent the additional ethanol used in 2016 in E15.

Many other actions need to be completed for these conversion projects at each station. Kits and parts need to be ordered and delivered and contractors lined up. As a result in the first month, December 2015 less progress may be made than expected but this deficit should be made up in the first couple of months of 2016 without any major impact on the schedule.

Advantages of Expediting the E15 Station Conversion Timing

Obviously, the implementation schedule timing has a major impact on the volumes of E15 that can be blended and sold during 2016. If production of the E15 upgrade kits and the installation schedule can be expedited, more ethanol in the form of E15 can be sold during 2016. To demonstrate this, an example has been put together assuming that the E15 upgrades and the other station work can be completed by July 1, 2016. Table 15 shows the benefits of cutting the conversion time by six months. E15 volumes increase from 14.28 to 21.19 bgy and the additional ethanol increases from 0.71 to 1.06 bgy.

Table 15. E15 and Ethanol Volumes Above E10 Blendwall Under an Expedited Conversion Schedule[37]

		Annual Volume			Jan 2016 to end 2016	
		Adjusted for E10 demand			Adjusted for E10 demand	
					Expedited Schedule	
		E15	Ethanol		E15	Ethanol
RFGE10 to RFGE15		11.93	0.60		8.95	0.45
Non-Ozone E10 to E15		15.58	0.78		11.42	0.57
7.8 RVp to 9.0		1.05	0.05		0.81	0.04
Total		28.56	1.43		21.19	1.06
% of national gasoline		21%			15%	
	E15 Stations	31123				

In the 13 months under consideration for this analysis, stations with three or more gasoline tanks would be able to convert from E10 to E15 or to invest in blender pumps, which would allow them to offer E10, E15 and E85, plus some additional grades if desired. Stillwater previously determined that 50 percent of stations meet this criterion. The remaining stations which would have only two gasoline tanks and a diesel tank or only have two gasoline tanks would have no option other than to convert to handle E15 regular and premium grades blended at the product terminal. Stillwater previously determined that these stations represent 50 percent of all stations.

One of the advantages of converting from E10 only to E15 only is that the E15 regular and premium could be blended at the products terminal without requiring that the terminal change

[37] The right hand columns, Jan 2016 to end 2016 reflect that the installations are phased in over the first six months of 2016 and this reduces the total 2016 throughputs.

hardware or tankage with the exception that terminal ethanol throughput might have to be expanded in a very few cases.

5.5 Upgraded Dispensers can Easily Handle the New E15 Volumes

Each of the two gasoline tank stations would move about 612,000 gallons per year (gpy). This amounts to about 51,000 gallons per month (gpm). With dispensers capable of 45,000 gpm each of these station's E15 volumes could be easily handled by two E15 dispensers with two hoses each. Each of the three or more gasoline tank stations will move about 1,224,000 gpy or 102,000 gpm. The four E15 dispensers at these stations will have no problem delivering this volume.

5.5.1 The Time since the Last Dispenser Replacement is Important

Before 2010, E10 was limited to mainly the Midwest and most stations did not have to worry about ethanol compatibility. Even back then nearly all of the tanks were compatible with ethanol. However many of the pipefittings and other systems were not ethanol compatible. Since that time E10 has become ubiquitous throughout the nation and most stations have become E10 compatible. For the most part E10 compatible equipment is also E15 compatible but many of the manufacturers have not taken all the steps to have their equipment completely certified or approved for E15, since it is not a commonly used fuel.

For the past two years, these manufacturers are now saying that they have determined that their E10 equipment is also E15 compatible or that some small gaskets, seals, hoses, etc. are all that have to be changed to become E15 compatible. There are still exceptions but they are diminishing and most of them can be fixed with upgrade kits (just like the dispensers) instead of having to replace the entire system.

Stillwater has found that about every seven years, stations replace dispensers and upgrade any of the other supporting tank and piping systems if required. This means that stations that went through this upgrading within the last five years have already completed a majority of the steps to be E15 compatible. The dispensers in these stations will need to be upgraded to be E15 compatible and some of the tank support systems and the piping systems will need to be upgraded or replaced.

Stations that have not replaced their dispensers in six years are at risk of having older tank support systems and older piping systems and will have higher costs to upgrade or replace this hardware. Stations that have not replaced their dispensers in seven years should be replacing their dispensers in 2016 and, since E15 dispensers cost no more than E10 dispensers, these stations should have no additional dispenser costs. For these stations, the tank support systems and older piping systems will have the same costs as stations that have not replaced their dispensers in six years.

5.5.2 Station Costs to Upgrade to E15

Stations with two gasoline tanks that have been upgraded in the past five years or less and that are only converting from E10 to E15 would have a $4,000[38] cost to upgrade their two dispensers and a $1,000 cost to modify any of the various tank systems. The total cost for these stations would be $5,000. Stations with two gasoline tanks that were upgraded six and seven years ago would have to make more modifications to the various tank systems for an additional $7,000. Total cost $11,000. Table 16 shows the cost itemization for stations with two gasoline tanks.

[38] Gilbarco Veeder-Root. *Frequently Asked Questions Encore 700S Encore S E25 Compatible Unit Options.* http://www.ethanolretailer.com/images/uploads/GilbarcoRetrofitKitE15(2).pdf

Table 16. Station Costs to Upgrade to E15 – Two Gasoline Tank Station

Two Gasoline tank station		
E15 Upgrade Costs		
5 years or less since last upgrade		
	2 E15 Upgrade kits+install	$ 4,000
	Piping & Tank system Changes	$ 1,000
	Total	**$ 5,000**
More than 5 years since last upgrade		
	2 E15 Upgrade kits+install	$ 4,000
	Piping & Tank system Changes	$ 7,000
	Total	**$ 11,000**
Would have upgraded in 2016		
	Piping & Tank system Changes	$ 7,000
	Total	**$ 7,000**

Stations with three or more gasoline tanks that have been upgraded in the past five years or less and that are only converting from E10 to E15 would have a $8,000 cost to upgrade their four dispensers and a $1,500 cost to modify the various tank systems. Total cost would be $9,500. Stations with three or more gasoline tanks that were upgraded six years ago would have to make more modifications to the various tank systems for an additional $8,000 plus the $8,000 cost to upgrade each of the four dispensers. Total cost $16,000. Stations that were upgraded seven years ago would be replacing the dispenser and upgrading again in 2016. Since a new E15 dispenser has the same cost as an E10 dispenser, these stations have no dispenser costs to upgrade to E15. Their only costs are for piping and tank system changes, which is estimated at $8,000. Table 17 shows the costs for stations with three or more gasoline tanks.

Table 17. Station Costs to Upgrade to E15 – Three Gasoline Tank Station

Three or more Gasoline tank station		
E15 Upgrade Costs		
5 years or less since last upgrade		
	4 E15 Upgrade kits+install	$ 8,000
	Piping & Tank system Changes	$ 1,500
	Total	**$ 9,500**
More than 5 years since last upgrade		
	4 E15 Upgrade kits+install	$ 8,000
	Piping & Tank system Changes	$ 8,000
	Total	**$ 16,000**
Would have upgraded in 2016		
	Piping & Tank system Changes	$ 8,000
	Total	**$ 8,000**

5.5.3 Total Costs to Convert E10 Stations to E15

Table 18 shows the breakdown of E15 stations by number of tanks. Note that, while the number of stations in each group is the same, the stations with three or more gasoline pumps move double the volume of E15. Table 19 sums up the costs to convert these stations from E10 to E15 at $255 million.

Table 18. Breakdown of E15 Stations by Number of Tanks

	Two Gasoline tank Stations 50%			Three or more Gasoline tank Stations 50%		
	E15	Ethanol		E15	Ethanol	
RFGE10 to RFGE15	3.98	0.20		7.96	0.40	
Non-Ozone E10 to E15	5.19	0.26		10.38	0.52	
7.8 RVP to 9.0	0.35	0.02		0.70	0.03	
Total	9.52	0.48		19.04	0.95	
Stations	15561			15561		
	E15 only			Can be Blender Pumps		
	0.61	mil gal per sta		1.22	mil gal per sta	

Table 19. Costs to Convert Stations from E10 to E15

	Two Gasoline tank Stations 50%			Three or more Gasolinetank Stations 50%		
	# of stations	Cost per Station	total in millions	# of stations	Cost per Station	total in millions
Upgraded in the past 5 years	11,115	$ 5,000	$ 56	11,115	$ 9,500	$ 106
Not upgraded in past 5 years	2,223	$ 11,000	$ 24	2,223	$ 16,000	$ 36
Would upgrade in 2016	2,223	$ 7,000	$ 16	2,223	$ 8,000	$ 18
Total	15,561		$ 96	15,561		$ 159
Total Cost for all stations to move from E10 to E15						$ 255

5.5.4 Costs for the Blender Pump Option

Stations with three or more gasoline tanks would have the option to install blender pumps that would give the station the option to offer E10, E15, E85 and perhaps E20 and E30. The blender pump would cost $20,000 with $2,000 installation costs. Thus to install a blender pump and upgrade a single existing dispenser will have an additional cost of $20,000 for stations upgraded in the past five years and the same cost for stations with older upgrades. Of these older stations not upgraded in the past five years, half of them would be scheduled to replace their dispenser in 2016. The cost to these stations would only be the $10,000 blender pump cost above a regular dispenser. Table 20 indicates that this flexibility would cost the 50 percent of stations that have three or more gasoline tanks a total of $316 million more than the cost to just switch from E10 to E15.

Table 20. Cost to Add a Blender Pump

	Three or more Gasoline tank Stations-50%		
	# of stations	Cost per Station	total in millions
Upgraded in the past 5 years	11,115	$ 22,000	$ 245
Not upgraded in past 5 years	2,223	$ 22,000	$ 49
Would upgrade in 2016	2,223	$ 10,000	$ 22
Total	15,561		$ 316

One may be tempted to look at the lowest cost option. Using cost as the only criterion would seem to eliminate blender pumps but a business owner must also weigh the risks of their decisions. Adapting E10 dispensers to use E15 forces the station owner to be able to sell only E15 (and perhaps some E10 if not all dispensers are converted). Installing blender pumps in place of E10 pumps allows the station owner to sell E15, E85 and perhaps some other high ethanol grade; while still maintaining the ability to sell E10 grades. This kind of “cover your bets” approach has a lot of appeal to business owners. For this reason Stillwater believes that the installation of blender pumps will be the method of choice for stations wishing to get into the E15 or E85 business.

5.6 E15 Summary

With sufficient economic incentives, station owners can be encouraged to convert their E10 stations to E15. While there are many restrictions on selling E15, it is still possible to blend 15 percent ethanol into RFG in states that have no E15 restrictions, into conventional gasoline during non-ozone seasons in states that have no E15 restrictions, and during the ozone season to blend 15 percent ethanol with low RVP BOBs in states that have no E15 restrictions. The conversion of the 31,123 stations where E15 is not restricted would have to be phased throughout 2016 but could enable E15 demand of 21.19 bgy, which would increase ethanol usage by 1.06 bgy.

6 The Best of both E15 and E85

There is very little overlap between E85 and the E15 cases. Combining the E85 case in which second dispensers are added to existing E85 stations, plus some E10 stations, and the expedited E15 case, reflects a scenario that maximizes ethanol usage in transportation fuel. Table 21 summarizes the volume results from this combination. Table 22 indicates the cost of this combined case. By combining these two cases ethanol usage can be increased by 2.90 bgy through E85 increases of 2.76 bgy and E15 increases of 21.19 bgy. This can be done at a total cost of just under $350 million.

Table 21. The Addition of Second E85 Dispensers at E85 Stations plus the Expedited E15 Conversion Case

		STATIONS	Throughput GPM	E85 BGY	E15 BGY	Ethanol BGY
E85	Existing E85 stations w/existing dispensers	3,000	45000	1.62		1.08
	2nd E85Dispenser when replacing dispensers	429	45000	0.12		0.08
	Additional 2nd E85 Dispensers	2,200	45000	0.54		0.36
	Add E85 Dispensers to E10 stations	1,950	45000	0.48		0.32
E15	RFGE10 to RFGE15	13,001	45000		8.95	0.45
	Non-Ozone E10 to E15	16,978	45000		11.42	0.57
	7.8 RVp to 9.0	1,144	45000		0.81	0.04
	Total E85, E15 and Ethanol Volumes Gained			**2.76**	**21.19**	**2.90**

Table 22. Costs of Adding Second Dispensers to Existing E85 Stations plus the Expedited E15 Conversion Case

		STATIONS	Cost	Subtotal $ million
E85	Existing E85 stations w/existing dispensers	3,000	$ -	$ -
	2nd E85Dispenser when replacing dispensers	429	$ 5,000	$ 2.1
	Additional 2nd E85 Dispensers	2,220	$ 15,000	$ 33.3
	Add E85 Dispensers to E10 stations	1,950	$ 30,000	$ 58.5
E15 Two gasoline tanks				
	Upgraded in the past 5 years	11,115	$ 5,000	$ 55.6
	Not upgraded in past 5 years	2,223	$ 11,000	$ 24.5
	Would upgrade in 2016	2,223	$ 7,000	$ 15.6
E15 Three gasoline tanks				
	Upgraded in the past 5 years	11,115	$ 9,500	$ 105.6
	Not upgraded in past 5 years	2,223	$ 16,000	$ 35.6
	Would upgrade in 2016	2,223	$ 8,000	$ 17.8
	Total Cost			$ 348.5

This combined case also demonstrates that the installation of E85 dispensers contributes significantly more to ethanol usage than the E15 station conversions. This means that the best approach to maximizing ethanol usage is through the addition of E85 dispensers. It is more cost effective to install second E85 dispensers in existing E85 stations than to install new E85 dispensers in E10 stations. Either of these options are more cost effective than converting existing E10 dispensers to E15.

6.1 Overall Summary

This report has developed several cases that demonstrate the potential for retail stations to supply large volumes of both E85 and E15. With sufficient economic drivers, enough additional E85 can be supplied to increase the volume of ethanol used in U.S. transportation fuel up to 1.84

bgy more than the expected 2016 E10 blendwall. E15 achieves lower levels of ethanol usage but can still increase the volume of ethanol by 1.0 bgy through the conversion of E10 dispensers to E15 in states that permit E15 sales. Finally, these two approaches can be combined to potentially achieve ethanol usage levels of 2.90 bgy.

Exhibit 5

Wayne
A GE Energy Business

January 14, 2014

To whom it may concern:

This letter is in response to recent inquiries about compatibility of equipment with various fuels.
Our standard fuel dispensers are listed under UL87 for fuels containing up to 10% ethanol (E10) and 5% bio diesel (B5). Our warranty for standard dispensers covers gasoline fuels with up to 15% ethanol content (E15) and diesel fuels with up to 20% bio content (B20). This warranty is applicable to all model years.

A broader fuel compatibility guide is provided here:

- Ethanol blends to 15% by volume. Note that some fuel filters are only compatible to E10 and may need to be upgraded for service with higher blends. Standard dispensers are UL listed up to E10 only.
- MTBE blends to 15% by volume
- Bio diesel to 20% by volume (B20) which complies with the ASTM D 6751 fuel standard. Given the nature of the fuel being composed of vegetable and other oils the potential exists for microbe growth and care should be taken in the selection and maintenance of fuel filters accordingly. This is also relevant given the nature of bio diesel to act as a 'scrubbing' agent in the tank previously used for other fuels. Note that standard dispensers are UL listed to B5 only.
- Kerosene
- AvGas and jet fuel, provided any fuel path metal restrictions are addressed with fuel supplier
- Wayne dispensers are not compatible with any blend of methanol as even small percentage blends can cause problems with seals and other components.

Note that fuel must meet applicable ASTM standard.

Dresser Wayne Ovation and Reliance dispenser models are available from the factory listed for use with E85 provided the equipment is installed with approved hanging hardware. Vista models are available for use with E 85 contingent upon retailer acceptance of conditions of sale.

Regards,

Patrick Jeitler
Dispenser Product Manager – North America

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ED000569_003756

Exhibit 6

Emissions Reductions from Current Natural Gas
Corn Ethanol Plants

Prepared for Growth Energy by Air Improvement Resource, Inc.

July 27, 2015

This analysis relies on U.S. Environmental Protection Agency (EPA) emissions data, supplemented with the most reliable and broadly used modeling data and land use change estimates, to assess current greenhouse gas (GHG) emissions from existing corn ethanol plants. Based on this data, current GHG emissions from corn ethanol plants are between 28% and 41% lower than current emissions from gasoline plants.

Table 1, which is drawn directly from the 2010 Renewable Fuel Standard final rule (RFS2), shows EPA's assessment of anticipated lifecycle GHG emissions for a natural gas dry mill corn ethanol facility for 2022.[1] The second column shows GHG emissions broken down by several stages of lifecycle impacts.

Table 1: Lifecycle GHG Emissions For Corn Ethanol, 2022 (average natural gas dry mill producing 37% wet DGs, 66% dry DGs)[2]

Lifecycle Component	*(Kg CO2e/MMBtu)*
Net Domestic Agriculture	4
Net International Agriculture	12
Domestic Land Use Change	-2
International Land Use Change	32
Fuel Production	28
Fuel and Feedstock Transport	4
Tailpipe	1
Total (mean)	**79**

As shown in Table 1, EPA estimated 2022 total emissions — including land use — to be an average of 79 Kg/MMBtu. EPA compared these projected corn ethanol emissions against baseline gasoline emissions of 98 Kg/MMBtu and concluded that ethanol emissions from natural gas facilities would be approximately 20% lower than gasoline facilities in 2022.

[1] *See* 75 Fed. Reg. 14788, Table V.C-1 (March 26, 2010).

[2] Distillers grains, or DGs, are a co-product of a corn ethanol dry mill plant. Some plants dry the DGs, primarily for ease of transport, while other plants keep them wet. Drying the DGs necessarily uses more energy than not drying the DGs.

The analysis in this report draws on the data from EPA's 2010 RFS2 final rule, as found in Table 1, but replaces the projected 2022 fuel production and land use change data with actual data from 2014 in order to assess *current* GHG emissions from natural gas ethanol facilities. To conduct this analysis, fuel production data was obtained from the recently released Argonne National Lab GREET 2014 model, which is a current and broadly used source of emissions data.[3] GREET is updated annually, and ethanol plant input information is sourced from a periodic, independent survey of actual natural gas ethanol plants.[4] We evaluated fuel production emissions for a dry mill plant using natural gas and producing both wet and dry distillers grains. Results are shown in Table 2. The results are shown in both g CO2e/MJ and Kg/MMBtu. For comparison to Table 1, we also weight the wet DGs emissions by 37% and the dry DGs emissions by 63%.

The weighted average emissions for 2014 are 29 Kg/MMBtu, which is very close to the 28 Kg/MMBtu estimated by EPA for the 2022 timeframe. This is indicates that many natural gas dry mill plants have adopted technologies improving yield and reducing process fuel consumption earlier than predicted by EPA. These technologies include sophisticated heat integration, combined heat and power strategies, variable frequency drives, advanced grinding technologies, various combinations of front and back-end oil separation, and innovative ethanol and dry DGs recovery.[5]

Table 2. Dry Mill Natural Gas Plant with 100% wet DGs and 100% dry DGs using GREET2014

Type	Production Emissions, g CO2e/MJ	Production Emissions, Kg/MMBtu
Wet DGs	22.72	23.86
Dry DGs	30.72	32.25
37% wet, 63% Dry DGs	27.76	29.14

For updated land use change data, this analysis draws on two sources. The first source is information from the California Air Resources Board (CARB) assessment of domestic and international land use change. CARB currently estimates the combined domestic and international land use change of corn ethanol

[3] GREET2014 and all documentation are located at https://greet.es.anl.gov/.

[4] *Updates to the Corn Ethanol Pathway and Development of an Integrated Corn and Corn Stover Ethanol Pathway in the GREET Model*, October 3, 2014, *available at* https://greet.es.anl.gov/publication-update-corn-ethanol-2014.

[5] S. Mueller and J. Kwik, Univ. of Illinois Chicago Energy Resources Center, *2012 Corn Ethanol: Emerging Plant Energy and Environmental Technologies* (April 29, 2013).

at 19.8 gCO2e/MJ.[6] When converted to Kg/MMBtu—the units used in EPA's data in Table 1—the combined land use change totals 20.9 Kg/MMBtu.

A second recent estimate of potential land use change emissions for corn ethanol was made by a group of authors from Argonne National Lab, the University of Illinois, the University of Illinois at Chicago, and the International Food Policy Research Institute.[7] The land use change emissions for corn ethanol in this analysis was a much lower 7.6 gCO2e/MJ. When converted to Kg/MMBtu, the value is 7.98 Kg/MMBtu. These two widely-differing estimates of the potential land use change emissions due to corn ethanol illustrate that the science of estimating land use change emissions for biofuels is far from mature. Nonetheless, both of these estimates for corn ethanol are more current than EPA's assessment, and provide the best estimate of the range of emissions from a current natural gas dry mill corn ethanol plant.

The summary of 2014 ethanol emissions, relying on this data from the GREET model, CARB and Argonne, is shown in Table 3. Items bolded are the only items modified from Table 1.

Table 3: Lifecycle GHG Emissions For Corn Ethanol, 2014 (natural gas dry mill, 37% wet DGs, 63% dry DGs)	
Lifecycle Component	*Kg CO2e/MMBtu)*
Net Domestic Agriculture	4
Net International Agriculture	12
Land Use Change	**7.98–20.9**
Fuel Production	**29**
Fuel and Feedstock Transport	4
Tailpipe	1
Total (mean)	**57.98–70.9**

As reflected in Table 3, current GHG emissions for a 100% dry distillers grain ethanol plant total between 61.1 and 75.6 KG/MMBtu. These total ethanol emissions are in the range of 28%–41% lower than EPA's baseline gasoline

[6] *Staff Report: Initial Statement of Reasons, Proposed Re-adoption of Low Carbon Fuel Standard* (Dec. 2014), available at http://www.arb.ca.gov/regact/2015/lcfs2015/lcfs2015.htm

[7] Dunn J., Qin, Z., Mueller, S. Kown, H., Wander, M., Wang, M., Argonne National Laboratory, *Carbon Calculator for Land Use Change from Biofuels Production*, ANL/ESD/12-5 (Jan 23, 2014).

emissions of 98 Kg/MMBtu, as reported in the agency's 2010 RFS2 final rule.[8,9] The reduced emissions from current corn ethanol facilities can be attributed to improved efficiencies and faster-than-expected adoption of new technologies at ethanol facilities.

At least one alternative analysis, published in 2011, contends that GHG emissions from corn ethanol in 2012 are instead 36% *higher* than baseline lifecycle gasoline emissions.[10] That analysis, however, which purports to use EPA information on the types of corn ethanol plants in the U.S., is fundamentally flawed, because it (1) assumes all U.S. corn ethanol plants produce 100% dry distillers grains, (2) assumes all dry mill plants producing 100% dry distillers grains have the same carbon intensity, (3) does not weight the percent change in emissions by ethanol volume, and (4) does not use a much more recent corn ethanol land use values.

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[8] 75 Fed. Reg. 14788, Table V.C-1 (March 26, 2010). The comparative emissions reduction from ethanol facilities would be even lower if the data included a mix of wet distillers' grains, as EPA assumed in its 2010 RFS2.

[9] We were unable to identify a 2014 value for gasoline from EPA to compare with the 2014 corn ethanol level. However, CARB has changed their gasoline estimate, between the current Low Carbon Fuel Standard (LCFS) and the proposed re-adoption of the LCFS. The current CARBOB (California Reformulated Gasoline Blendstock for Oxygenate Blending) CI level is 99.18 gCO2e/MJ. *See* CARB, Proposed Second 15-Day Regulation Order, p. 59 Table 6, *available at* http://www.arb.ca.gov/regact/2015/lcfs2015/lcfsmodregorder.pdf, at Attachment A, p. 59 Table 6 (showing both the current and proposed CARBOB CI values, with strikeouts through the old regulation order). Thus, the CARBOB CI has *increased* by 0.6% since EPA published its RFS2 in 2010.

[10] Kate McMahon and Victoria Witting, *Corn ethanol and climate change* (July 2011).

Exhibit 7

EPA Proposed Renewable Fuel Standards for 2014–2016: Lost Greenhouse Gas Benefits from Conventional Biofuel

Prepared for Growth Energy by Air Improvement Resource, Inc.

July 27, 2015

The U.S. Environmental Protection Agency's (EPA's) proposed Renewable Fuel Standard (RFS) volumes for 2014, 2015, and 2016 proposes significantly lower conventional biofuel volumes than the statutory requirements. The purpose of this study is to estimate the lost GHG emission benefits that would result from finalizing these lower conventional fuel requirements. We find that EPA's proposed volumes for 2014–2016 would result in 6.3 million metric tons of lost GHG emissions benefits over the 2014–2016 period.

Table 1 shows the volume differences between EPA's RFS proposal for conventional biofuel and the statutory requirements. In the 2014–2016 period, the EPA proposal falls short of the statutory requirements by between 1–1.6 billion gallons per year (bgy), with a total shortfall from 2014–2016 of 3.75 billion gallons.

Table 1. Conventional Biofuel Requirement (bgy) and EPA RFS Proposal[1]

Year	Statutory Requirement	EPA Proposal	Difference
2014	14.4	13.25	1.15
2015	15.0	13.4	1.6
2016	15.0	14.0	1.0

Conventional biofuels have lower lifecycle GHGs than the gasoline they replace. As a consequence, using less conventional biofuels results in a corresponding reduction in GHG reductions. The annual emission shortfalls can be estimated with the following expression, which incorporates the volume differences from Table 1:

GHG = Gallons * 76,330 btu/gal * 1MMBtu/1,000,000 btu * [98 Kg/ MMBtu – 79Kg/MMBtu] * 0.2 * 1 metric ton/1000kg

Where

GHG = GHG shortfall in metric tons

[1] The statutory conventional volumes draw on the volumes in Table 1.A-1 of EPA's Notice of Proposed Rule Making (NPRM, at page 9) and are calculated by subtracting the advanced biofuel volumes from the renewable fuel volumes. EPA's conventional proposal volumes are estimated from Table I.A-3 of the NPRM, using the same approach.

Gallons = conventional fuel requirement difference (from Table 1)
76,330 Btu/gallon is energy content of ethanol [2]
98 Kg/MMBtu = lifecycle GHG of gasoline
79 Kg/MMBtu = lifecycle GHG of average dry mill ethanol plant

The 98 Kg/MMBtu is EPA's estimate of the lifecycle GHG emissions of gasoline, which ethanol replaces.[3] EPA's analysis of the lifecycle emissions of a typical natural gas dry mill producing ethanol is 79 Kg/MMBtu.[4] Thus, the GHG benefit of the conventional ethanol over gasoline is 19 Kg/MMBtu.

Using the expression described above on the volumes from Table 1, we obtain the GHG shortfalls in Table 2. As shown in Table 2, EPA's proposed volumes for 2014-2016 would result in 6.3 million metric tons of lost GHG emissions benefits over the 2014–2016 period.

Table 2. GHG Emission Shortfall of EPA's Conventional Biofuel RFS Proposal

Year	Ethanol Volume Shortfall (bgy)	Emission Shortfall (metric tons per year)
2014	1.15	2,537,973
2015	1.6	2,320,432
2016	1.0	1,450,270
Total (2014–2016)	3.75	6,308,675

[2] *See* http://cta.ornl.gov/bedb/appendix_a/Lower_and_Higher_Heating_Values_of_Gas_Liquid_and_Solid_Fuels.pdf
[3] *See* 75 Fed. Reg. 14788, Table V.C-1 (March 26, 2010).
[4] In its 2010 RFS2 rule, EPA's estimated lifecycle ethanol emissions of 79 Kg/MMBtu for calendar year 2022. However, as shown in a separate report to appended to Growth Energy's Comment on the proposed rule, this value is conservative even for 2015. *See* Air Improvement Resource, Inc., *Emissions Reductions from Current Natural Gas Corn Ethanol Plants* (July 27, 2015).

Exhibit 8

The Impact of an RFS Waiver on the Ethanol Industry and Broader Economy in 2016

Edgeworth Economics

July 27, 2015

The U.S. Environmental Protection Agency's (EPA's) proposal to set the Renewable Fuel Standard (RFS) biofuel mandates below the statutory levels can be expected to cause a reduction in demand for biofuels, relative to a scenario in which the statutory mandates were maintained. Table 1 shows EPA's proposed requirements, compared to the statutory mandates. Table 1 also shows these totals if the requirement for cellulosic ethanol is excluded and the statutory requirement for biomass-based diesel (BBD) is assumed to equal EPA's proposed volumes. Under this second scenario, EPA's proposal implies a reduction in total biofuels consumption of as much as 0.81 billion gallons in 2016.[1] EPA's proposed level for advanced biofuels exceeds the statutory mandate; therefore meeting the implied "target" for conventional biofuels actually would require a larger increase in the volume of that fuel type—an additional 1.0 billion gallons in 2016.

Table 1
Comparison of Statutory and Proposed Biofuel Mandates in 2016
(billion ethanol-equivalent gallons)

	Statutory	Proposed
Cellulosic	4.25	0.206
Biomass-Based Diesel	≥1.0	1.8
Advanced (inclusive of Cellulosic and BBD)	7.25	3.4
Total	22.25	17.4
Implied Conventional (Total less Advanced)	15.0	14.0
Exclude Cellulosic and Assume Statutory Requirement for BBD Equals EPA's Proposal		
Advanced	3.0	3.19
Total	18.0	17.19
Implied Conventional (Total less Advanced)	15.0	14.0

Source: EPA NPRM, May 29, 2015.
Note: Biomass-based diesel volumes are in actual gallons.

There are presently 212 ethanol production facilities in the U.S. with total capacity in the range of 15.0 to 15.4 billion gallons annually, with another three facilities totaling 0.1 billion gallons of capacity presently under construction.[2] Since the amount of available capacity in the U.S. to produce ethanol exceeds the quantity for the implied "target" for conventional biofuels in 2016, a reduction in the requirements implies either the idling or permanent closure of presently operating facilities or the continued idling of facilities that are not producing at present, but which would be operating if requirements were increased.[3]

[1] The figure of 0.81 billion gallons is based on an assumption that compliance with higher mandate levels would be met by increases in production and consumption, as opposed to a drawdown of banked RINs.

[2] The Renewable Fuels Association (RFA) estimates operating capacity at 199 open facilities of 15.0 billion gallons and nameplate capacity at all 212 facilities of 15.4 billion gallons. *See* ethanolrfa.org/bio-refinery-locations.

[3] Again, assuming compliance is accomplished through increased production and consumption of conventional ethanol, rather than drawdown of banked RINs or additional supplies of other biofuels.

The most direct economic impact from a decline in demand for ethanol is felt at those ethanol production facilities that would be forced to idle or close. This would cause a series of adverse economic impacts to the local regions. First, these plants would lose any operating profits generated by current levels of production. In addition, the plants would be expected to lay off some or all of their workforces, cease to purchase inputs from local vendors, and reduce tax payments to local jurisdictions. Finally, additional economic activity would be lost to the host regions when the reduction in revenues causes employees and vendors to reduce their own local purchases from restaurants, retail establishments, etc. (the "multiplier" effect).

As shown in Figure 1, most U.S. ethanol capacity is located in the Midwest.[4] It would be difficult to predict which particular facilities would cease operations in response to a decrease in ethanol demand. However, we can estimate economic impacts based on a "typical" facility with the following characteristics:

- Annual production capacity/output: 75.4 million gallons.[5]
- Employment: 0.8 employees per million gallons of ethanol produced annually, or about 60 employees for an average facility.[6]
- Annual revenues from sales of ethanol and co-products: approximately $2.60 per gallon of ethanol produced or $196 million per year.[7]

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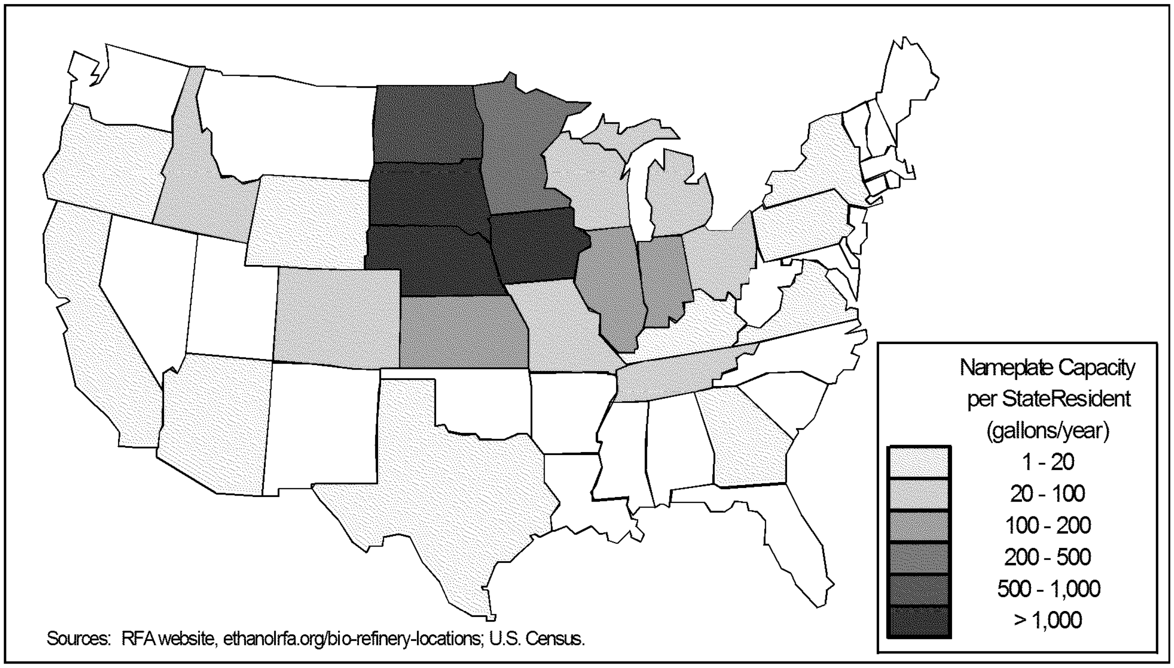
[4] 73 percent of U.S. capacity is located within Iowa, Nebraska, Illinois, Indiana, Minnesota, and South Dakota. [RFA website, ethanolrfa.org/bio-refinery-locations] In Figure 1, we show capacity on a per-capita basis to provide a more appropriate measure of the relative importance of ethanol production to the local economies.

[5] *See* www.ethanolrfa.org/pages/statistics.

[6] Based on various sources, including: John Urbanchuk, "Contribution of the Ethanol Industry to the Economy of the United States," Cardno ENTRIX, prepared for the Renewable Fuels Association, February 2, 2012; David Swenson, "Understanding Biofuels Economic Impact Claims," Iowa State University, April 2007; public SEC filings; and proprietary data provided by members of Growth Energy.

[7] Based on 2014 data from public SEC filings and proprietary information provided by members of Growth Energy.

Figure 1
U.S. Ethanol Operating Capacity, per State Resident



Based on these figures, EPA's proposal, which would cause a reduction in the statutory "target" for conventional biofuel by 1.0 billion gallons in 2016, will result in the closure or continued idling of approximately 13 ethanol plants and the loss of 800 jobs at those facilities, with reduced revenues from ethanol and co-product sales of $2.6 billion.

In addition to these direct effects, the regions that host ethanol production facilities would experience additional reductions in economic activity stemming from reduced purchases of locally-sourced inputs (the "indirect" impact) and reduced spending by facility employees and local vendors (the "induced" impact). These additional economic impacts are generated by the multiplier effect, which results from the recycling of business revenues and household income within the local region.

A number of researchers have developed estimates of the relevant multipliers for the ethanol industry. These estimates depend on a number of factors, including:[8]

- *The relevant region* – When indirect/induced economic effects are calculated for larger and/or more developed regions, the multipliers tend to be larger, since a greater fraction of local business revenues and household income will tend to be re-spent within that region.
- *Impact on local farmers* – The multiplier estimate depends on the assumptions regarding the change in crop prices in response to an ethanol plant closure. If local crop prices fall, farmers will experience a reduction in income and may alter their planting behavior.

[8] See, for example, Susan Christopherson and Zachary Sivertsen, Cornell University, *Economic Policy Makers Beware: Estimating the Job Impact of Public Investment in Biofuel Plants* (working paper, Dec. 12, 2009); Dave Swenson, Iowa State University, *Input-Outrageous: The Economic Impacts of Modern Biofuels Production*, (June 2006).

- *Economies of scale* – Reduced spending by the ethanol industry on local utilities and the transport industry may result in additional reduced economic activity, but the total effect may not be proportional to the change in ethanol output, due to scale economies in those other industries.

Plausible estimates for the overall multiplier effect for employment applicable to the ethanol industry range from about 2 (indicating a total impact on employment equal to two times the direct employment impact) to about 7.[9] Based on our review of the literature, we conclude that a value of 4 is a reasonable figure from this range. Applying this multiplier to the direct employment impacts calculated above, we calculate that a waiver of the RFS mandate would result in a loss of approximately 3,200 jobs in ethanol producing regions, based on the 1.0 billion gallon estimate.

Finally, reduced economic activity caused by plant closures would have adverse effects on state and local government budgets due to reductions in tax collections on property, sales, and wages. Based on the previously cited research, we estimate that a waiver of the RFS mandate would result in a loss of approximately $31 million in tax revenues to the regions hosting ethanol plants.[10]

Table 2 summarizes our calculations regarding direct and overall economic impacts based on a reduction of up to 1.0 billion gallons of conventional ethanol production.

Table 2
Economic Impacts Associated with Closed Ethanol Production Facilities
Caused by a Reduction of the RFS Mandate in 2016

Decline in Ethanol Production	up to 1.0 billion gallons
<u>Impacts based on 1.0 billion gallon reduction</u>	
Number of Closed Facilities	13
Lost Revenues at Closed Facilities	$2.6 billion
Lost State/Local Tax Revenues	$31 million
Reduced Employment at Closed Facilities	800 jobs
Overall Reduced Employment in Ethanol Producing Regions	3,200 jobs

[9] See, for example, Urbanchuk, February 2, 2012, *op. cit.*; Swenson, April 2007, *op. cit.*; Christopherson and Sivertsen, December 12, 2009, *op. cit.*; and Swenson, June 2006, *op. cit.*

[10] Swenson [June 2006, *op. cit.*] calculates regional indirect tax revenues generated by economic activity at the ethanol plant and through the multiplier effect equal to approximately 1.2 percent of plant revenues.

Exhibit 9

Analysis of Whether Higher Prices of Renewable Fuel Standard RINs Affected Gasoline Prices in 2013

informa economics

A Whitepaper
Prepared for the Renewable Fuels Association
January 2014

Key Findings

- Changes in prices of renewable identification numbers (RINs) did not cause changes in retail gasoline prices in 2013.
- Retail gasoline prices were driven primarily by movements in crude oil prices and secondarily by changes in the spread between domestic and international crude oil prices and the level of vehicle miles driven in the U.S., which varies seasonally.

Background and Introduction

The Renewable Fuel Standard, which requires gasoline sold in the U.S. to contain at least certain minimum volumes of bio fuel, was created by the Energy Policy Act of 2005. Two years later, the Energy Independence and Security Act of 2007 significantly expanded the previous targets, and the revised Renewable Fuel Standard (known as RFS2) was allocated among specific categories of renewable fuels.

A system of renewable identification numbers was designed by the EPA and is used by parties (mainly refiners) that are obligated to comply with RFS2. A RIN is a 38-digit code representing a specific volume of renewable fuel. RINs are generated by a producer or importer of renewable fuel, and once the fuel is blended the separated RINs can be used for compliance purposes, held in inventory for future compliance, or traded.

Market participants began to realize in early 2013 that ethanol usage could fall well short of the level needed to meet RFS2, and prices of conventional ethanol RINs rose to levels that were multiples of any that had been experienced previously, spiking to nearly $1.50 during the summer. This was in part a result of the 2012 drought, which reduced the size of the corn crop and led to record-high prices and the idling of ethanol plants in late 2012 and early 2013, as market prices for ethanol were not sufficient to allow producers to offset higher production costs and sustain significantly positive margins.

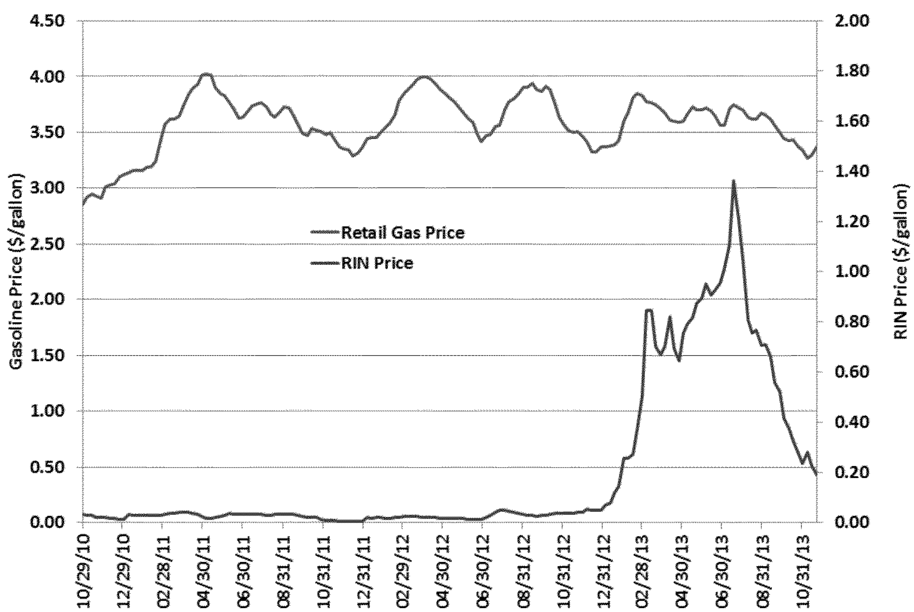
The retail price of gasoline in the U.S. also increased during the late winter and early spring of 2013. Although this is consistent with seasonal patterns that have historically been experienced in advance of the summertime "driving season" – and gasoline prices actually declined somewhat during the late spring and then remained within a relatively well-defined range over the summer – the coincidental timing led some commentators to speculate that RIN prices might be driving retail gasoline prices higher.

Now that 2013 has ended and gasoline prices have declined, the Renewable Fuels Association ("RFA") commissioned Informa Economics, Inc. to conduct an analysis of whether the significant increase in RIN prices led to higher gasoline prices for U.S. consumers, or if not, what did contribute to higher gasoline prices during the middle of 2013. Informa conducted its analysis in two phases. First, Informa used a statistical method to determine whether changes in RIN prices "caused" (i.e., were a significant driver of) changes in retail gasoline prices. Second, a streamlined statistical regression "explaining" gasoline p rice movements was developed; it was intended that i f the first part of the analysis concluded that changes in RIN prices have "caused" changes in gasoline prices, RIN prices also would be included in the regression during the second phase of the analysis, in order to quantify their impact.

Causality Analysis

In order to test whether or not changes in RIN prices "caused" changes in retail gasoline prices, a statistical method called a Granger causality analysis was utilized. Weekly average RIN prices reported by OPIS for the period spanning from October 29, 2010, to November 22, 2013, were paired with weekly average retail gasoline prices reported by EIA for the same time period (Exhibit 1). The chart below provides a look at the raw data involved in the analysis. Prior to use in the Granger models, the data were differenced, and thus, the resulting models were built using the weekly change in RIN prices compared to the weekly change in gasoline prices.

Exhibit 1: Weekly Retail Gasoline and Conventional Ethanol RIN Prices



Sources: DOE-EIA (Gasoline Prices), OPIS (RIN Prices)

Of primary interest was the question: Did increasing RIN prices cause gasoline prices to rise? To test this, an initial model was developed that specified the current change in gasoline price as a function of the previous week's change in the price of gasoline. Next, a secondary model was constructed identical to the first, except that the previous week's change in the RIN value was added as an explanatory variable.

The idea behind the Granger causality analysis is simple: If the second mode l (containing the lagged RIN variable) is superior to the initial model, then this means that the previous week's RIN price has some explanatory power relative to the current week's gasoline price. If this is found to be the case, then it can be asserted that gasoline price changes are "caused" by changes in the RIN price. The term "caused" is used loosely here, since it does not imply that the RIN price was the only factor affecting gasoline prices. In the context of this analysis, the term "caused" would simply refer to the presence of some connection between the change in the RIN price and subsequent changes in gasoline prices.

To determine if one model is superior to another, it is appropriate to look at the size of the error terms associated with each model (i.e., the difference between the actual prices observed and the prices that would have been predicted by the model). If the errors from one model are significantly smaller than those of the other, this implies that the model has superior predictive power, and thus, is a better representation of reality.

Granger causality analysis compares the sum of squared errors associated with the model containing the RIN variable with same statistic for the model that does not contain the RIN variable. Exhibit 2 provides the results of the Granger causality analysis. The P-values reported in the table measure the probability that the errors from the unrestricted model (the one containing RIN values) are the same as the errors from the restricted model (no RIN value). There is a 74% chance these model errors are not significantly different, leading to the conclusion that changes in RIN prices do not appear to cause changes in gasoline prices.

Exhibit 2: Results of the Granger Causality Test

	---- P Values -----
RIN Price Causes Gas Price	**0.741**
Gas Price Causes RIN Price	**0.107**
	---- Significant at 5% Level? ----
RIN Price Causes Gas Price	**N**
Gas Price Causes RIN Price	**N**

P-values are the probability that the sum of squared errors in the unrestricted model is not different from the sum of squared errors in the restricted model.

It is worth noting that as an auxiliary part of this analysis, a second set of models was prepared that reversed the flow of causality, in order to examine whether or not changes in the gasoline price caused changes in RIN values. In the reverse case, there is a 10% chance that there is no difference between the models, and though this probability is much lower than for the RIN-to-gasoline case – implying that there is a higher probability that changes in gasoline prices "caused" changes in RIN prices – this is generally not considered strong enough to make this conclusion. Technically, most scientists like to see a probability of 5% or smaller in order to reject the hypothesis that the models are not different.

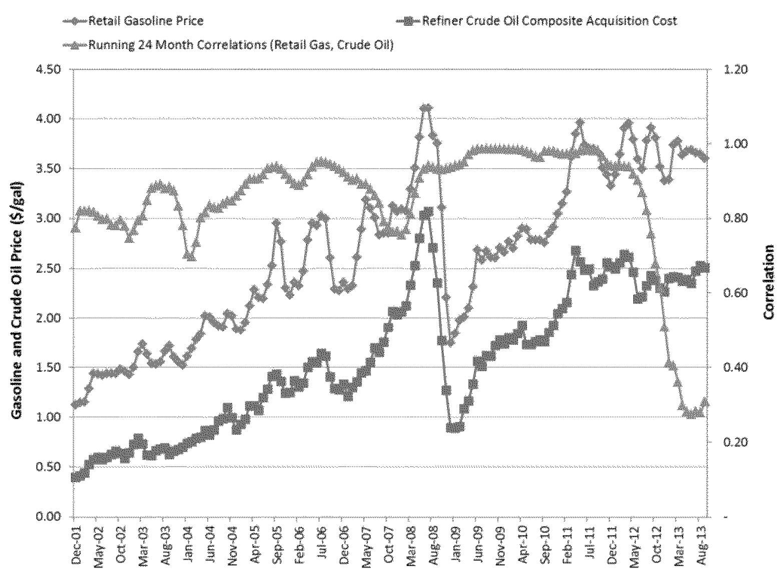
In summary, the evidence from the Granger causality work leads to the conclusion that changes in RIN prices have not caused changes in retail gasoline prices (or vice-versa). To any extent that the two are related, it is not a direct causal relationship.

Gasoline Price Drivers

Since it was determined that RIN prices have not driven retail gasoline prices, a second question naturally arises: What did cause gasoline prices to be higher during the middle of 2013? Accordingly, the second phase of the analysis examines the key factors that do "explain" retail gasoline price movements. It should be remembered that RINs were created only in the aftermath of the establishment of the Renewable Fuel Standard in 2005, and the differentiation of RINs by biofuel category did not take effect until 2010, whereas gasoline prices have been volatile for decades.

The primary driver of retail gasoline prices is crude oil prices, as crude oil is the primary input in gasoline production. Historically, the running 24-month correlation between crude oil[1] and retail gasoline prices has generally been between 0.80 and 0.99, which indicates a very strong relationship given that a coefficient of 1.00 would indicate perfect positive correlation (Exhibit 3).

Exhibit 3: Monthly Retail Gasoline and Crude Oil Price Relationship



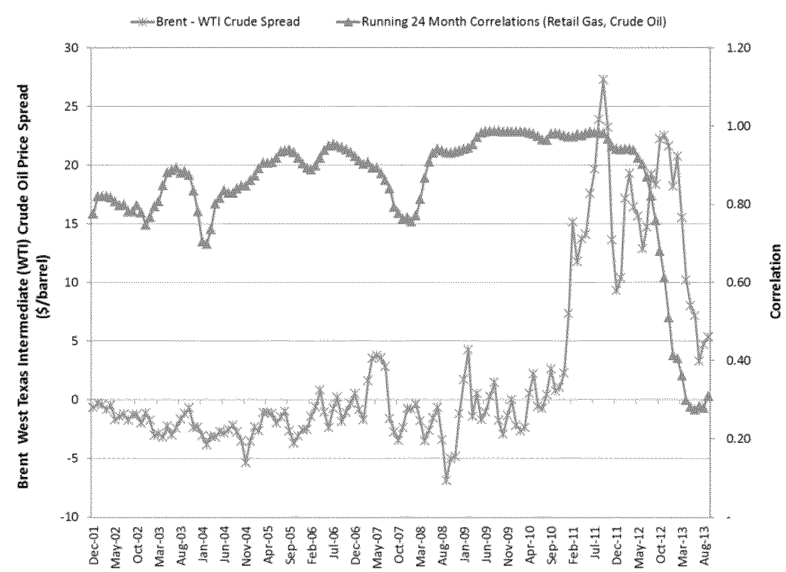
Sources: EIA (Prices); Informa Economics (Analysis)

[1] For each month illustrated in Exhibit 3, the correlation between crude oil and retail gasoline prices over the previous 24 months was examined. Refinery composite crude oil acquisition cost data was utilized to represent crude oil costs for U.S. refineries, as this reflects a weighted U.S. average of imported and domestic crude oil used to produce gasoline.

However, this relationship began to show signs of weakening starting in the spring of 2012. One of the key factors behind this weakening has been the divergence between international and domestic crude oil prices and the heightened volatility of the spread between these prices [2]. This divergence was mainly attributable to growing crude oil stocks at inland locations – especially the delivery point for NYMEX crude oil futures at Cushing, Oklahoma – as a result of a combination of increased domestic oil production from shale plays such as North Dakota's Bakken formation and lagging infrastructure build-out to move the oil to consumption centers. Conversely, this spread has narrowed throughout 2013, as infrastructure has come on line to facilitate movements of crude to the Gulf Coast. At the same time, the U.S. has emerged as an exporter of gasoline. Consequently, a layer of complexity has been added to U.S. gasoline pricing dynamics, as the price of Brent crude oil, which serves as an international benchmark and influences the pricing of gasoline in international markets, has been elevated relative to domestic crude.

As illustrated within Exhibit 4, the weakening price relationship between crude oil and retail gasoline price followed the growing spread between U.S. West Texas Intermediate (WTI) and Brent crude oil prices [3]. It is also notable that this weakening price relationship preceded the increase in RIN prices.

Exhibit 4: Monthly Brent-to-WTI Crude Oil Price Spread vs. Retail Gasoline and Crude Oil Price Correlation



Sources: EIA (Prices); Informa Economics (Analysis)

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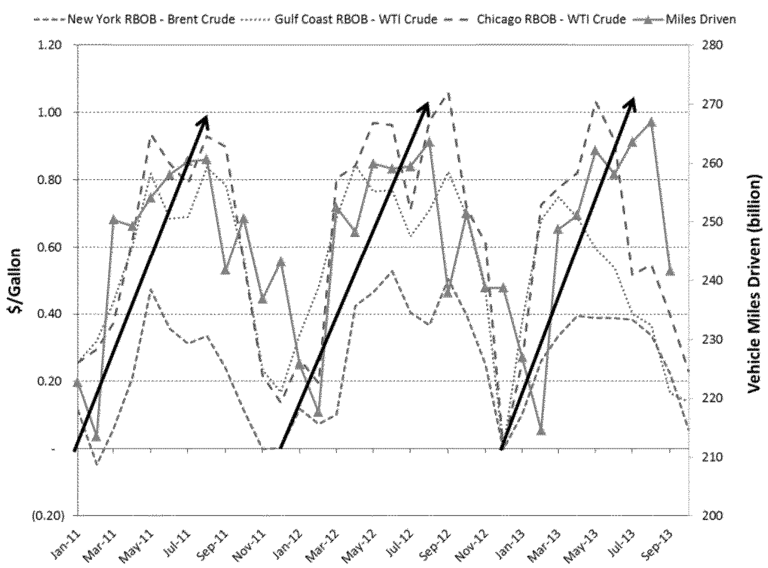
[2] Brent crude oil prices were utilized to represent prices in the international market, and WTI prices were utilized to represent prices in the domestic market.
[3] It is notable that the chart uses a 24-month correlation, and thus there is a lag between when the Brent-WTI price spread begins to expand and when the correlation between crude oil and retail gasoline prices appears to weaken in the chart.

Another factor effecting retail gasoline prices is seasonal demand. There is a distinct seasonal pattern to gasoline prices and crack spreads (i.e., the margins refiners earn by processing crude oil into transportation fuels, in this case gasoline). Gasoline prices and crack spreads tend to slump during the last quarter of the calendar year, particularly November and December, and then strengthen considerably through the first quarter of the year and remain strong through the summerti me driving season (see Exhibit 5). A key factor in this is the increase in vehicle miles driven during the summer months, which is anticipated by the markets and prepared for by refiners.

Exhibit 5: Seasonal Crack Spreads and Vehicle Miles Driven



Sources: EIA (crude oil prices), OPIS (RBOB prices), U.S. Department of Transportation (miles driven), and Informa Economics (analysis)

The relative role of each of the above factors in "explaining" movements in retail gasoline prices was estimated econometrically[4], and results are presented in Exhibit 6. The majority of gasoline price movements can be explained by crude oil prices. A \$0.10/gallon increase in crude oil prices (\$4.20/barrel) has resulted in a roughly \$0.10/gallon increase in retail gasoline prices, all else being held equal. In the model, variables for the Brent-WTI crude oil price spread and vehicle miles driven were also statistically significant, and they improved model performance somewhat. Together these variables explain 95% of the historical retail gasoline price movements (as indicated by the adjusted R-squared statistic). It should be noted that this model was also run with conventional ethanol RIN prices included, but RIN prices were not found to be statistically significant at a 5% level.

[4] Monthly data from April 2008 – September 2013 was utilized within this regression.

Exhibit 6: Retail Gas Price Model

Dependent Variable = U.S. Retail Gasoline Price

Explanatory Variable	Coefficient	Statistically Significant at 5% Level
Intercept	0.098	
Refiner Crude Oil Composite Acquisition Cost	1.049	Yes
Brent - WTI Crude Oil Price Spread	0.010	Yes
Vehicle Miles Driven	3.432 * 10^6	Yes

Adjusted R-Squared = .954

Source: Informa Economics

Conclusions

Although retail gasoline prices and RIN prices both increased in early 2013 and remained elevated (though volatile) during the middle of the year, this was mainly coincidental, and upon closer examination it can be determined that these changes generally occurred for different reasons. In fact, the increase in gasoline price early in the year actually pre-dated the increase in RIN prices. Based on statistical analysis, it can be concluded that changes in RIN prices did not "cause" the changes in retail gasoline prices in 2013.

Exhibit 10

Retail Gasoline Price Impact of Compliance with the Renewable Fuel Standard

informa economics

Whitepaper
Prepared for the Renewable Fuels Association
March 25, 2013

Key Findings

- A fact-based review of developments in the gasoline, ethanol and Renewable Identification Number (RIN) markets indicates that the Renewable Fuel Standard in general and RINs in particular have not been a demonstrable factor in the rise in retail gasoline prices that has occurred in early 2013.
- There is a distinct seasonal pattern to gasoline prices and crack spreads, slumping during the last quarter of the calendar year and then strengthening considerably through the first quarter of the following year. The increase in gasoline prices and crack spreads during the first quarter of 2013 has been generally consistent with increases experienced in 2011 and 2012, despite the fact that conventional ethanol RIN prices averaged $0.03 during the first quarter of 2011 and $0.02 during the first quarter of 2012.
- Considering both the ethanol price advantage versus gasoline and the direct cost of currently elevated RIN prices, there is actually a net benefit to consumers due to the usage of ethanol within the Renewable Fuel Standard:
  - The direct effect on retail gasoline prices associated with elevated RIN costs is only $0.004 per gallon in a "reference case" and a maximum $0.02 per gallon in a "high case." The costs and other assumptions in the high case make it, in some regards, a logical extreme.
  - However, focusing only on RIN prices provides only part of the picture of the impact of ethanol on gasoline prices paid by consumers. Thus far in 2013, ethanol prices have on average been $0.44 per gallon below wholesale gasoline prices, which translates to a gross benefit of $0.04 per gallon of finished motor gasoline supplied to consumers.
  - Considering both the ethanol price advantage and the direct cost of RIN prices, the net benefit to consumers from the usage of ethanol is $0.04 per gallon of gasoline in the reference case and $0.02 per gallon in the high case.

Introduction

A public debate has flared up regarding whether retail gasoline prices are being impacted by the recent run-up in the prices of RIN credits used to demonstrate compliance with the federal Renewable Fuel Standard. The standard, which requires an increasing amount of biofuels to be blended into the nation's fuel supply, was originally established by the Energy Policy Act of 2005 and was expanded by the Energy Independence and Security Act (EISA) of 2007 (and is now referred to as RFS2).

An opinion piece in *The Wall Street Journal* on March 11 stated that if the EPA were to suspend the RFS2 ethanol requirement, "…the price of gas would quickly fall by about five to 10 cents a gallon." Similar refrains have been heard from others in the media and the petroleum industry. Counter-arguments have been made by supporters of renewable fuels, who contend that claims of retail gasoline price impacts of up to 10 cents per gallon are significantly exaggerated.

Informa Economics, Inc. was commissioned by the Renewable Fuels Association (RFA) to provide a third-party assessment of the impact that RINs are having on retail gasoline prices.

The objective of this whitepaper is to examine the data and provide fact-based insights on this issue. Informa's analysis and the contents of this paper were developed independently.

Overview of the 2013 Situation

The 2012 drought resulted in a small crop and record-high prices for corn, the main feedstock for ethanol production in the U.S. Market prices for ethanol have not been sufficient to allow producers to offset higher production costs and maintain significantly positive margins on a sustained basis, and ethanol facilities have been idled. As a result, Informa projects that U.S. ethanol production will fall by nearly 550 million gallons in 2013, to a level of 12.8 billion gallons.

Grain-based ethanol consumption also is expected to be subdued at 12.5 bil. gal. in 2013, due to reduced production and the presence of the so-called blend wall, which reflects the historical constraint of the ethanol content in gasoline to 10%, except for gasoline used in flex-fuel vehicles. The Environmental Protection Agency (EPA) has issued waivers allowing blends of up to 15% (E15) in model year 2001 and newer light-duty vehicles, but sales of E15 are expected to remain small in 2013.

This level of consumption is well short of the effective RFS2 allocation to corn-based ethanol of 13.8 bil. gal. However, despite this shortfall, the blending of ethanol has not been maximized thus far in 2013. Whereas 95% of the gasoline supplied to the U.S. market in 2012 contained ethanol (reaching as high as 98.6% on a weekly basis), in January and February 2013 this share averaged only 93%, indicating that usage actually pulled back from the blend wall. As a result, the parties that are obligated to comply with RFS2 (mainly refiners and importers) will have to draw down their inventories by 1.3 billion RINs in 2013, relative to the 2.1 billion RINs estimated to have been carried over from 2012.

A substantial majority of RINs are obtained by obligated parties directly through ethanol purchases/blending or indirectly via contractual relationships with independent blenders. However, given the sizable draw-down in RINs expected in 2013, the market is anticipating that some obligated parties that do not have sufficient RINs banked or an extensive blending network will have to acquire RINs on the open market. On the other hand, obligated parties with excess RINs and especially independent blenders that are not obligated parties now have substantial market power.

As a result, RIN prices have increased in 2013 to levels that are multiples of any prices experienced previously. As reported by the Oil Price Information Service (OPIS), between January 2 and March 22, the average daily price for conventional ethanol RINs generated in 2013 was $0.37, reaching a daily high of $1.06 on March 11. By comparison, the average price for 2012 was $0.03. (One RIN represents one gallon of ethanol.[1])

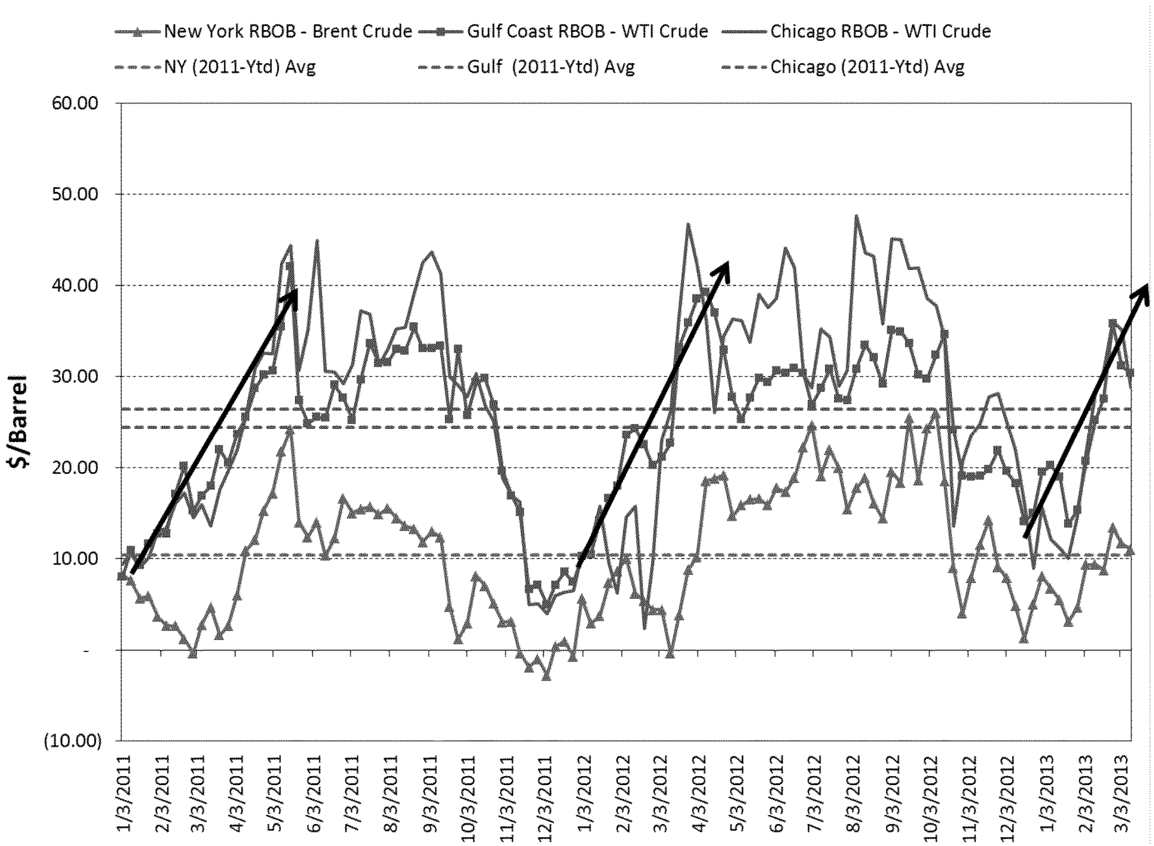
Fuel Market Analysis

There is a distinct seasonal pattern to gasoline prices and crack spreads (i.e., the margins refiners earn by processing crude oil into gasoline) – a pattern that has direct implications for the current debate about the impact of RIN prices on retail gasoline prices. **Gasoline prices**

[1] This analysis focuses on conventional corn-based ethanol RINs, referred to as D6 RINs due to the "D-code" embedded in the 38 digits that comprise a RIN.

and crack spreads slump during the last quarter of the calendar year, particularly November and December, and then strengthen considerably through the first quarter of the ye ar and remain strong through the summertime driving season. This pattern is reflected in Exhibit 1, which shows gasoline crack spreads since the start of 2011, a period encompassing the recovery of the economy and petroleum prices from the Great Recession that began in December 2007.

Exhibit 1: Gasoline Crack Spreads for Chicago, New York and the Gulf Coast



Sources: OPIS (Gasoline Prices), DOE-EIA (Crude Oil Prices), Informa Economics (Calculations)
Notes: RBOB is a standard grade of unleaded gasoline for ethanol blending in areas where reformulated gasoline is sold . Gulf Coast and Chicago crack spreads are based on prices of West Texas Intermediate (WTI) crude oil at Cushing, Oklahoma, the reference grade and pricing point for U.S.-produced crude oil. Ho wever, refiners on the East Coast have less access to increasing production of crude oil from U.S. shale formations; accordingly, the New York crack spread is based on prices of Brent crude oil, which is very highly correlated with the overall U.S. refiner acquisition cost of imported crude oil.

The increase in gasoline prices and crack spreads during the first quarter of 2013 has been generally consistent with increases experienced in 2011 and 2012, despite the fact that conventional ethanol RIN prices averaged $0.03 during the first quarter of 2011 and $0.02 during the first quarter of 2012 . Notably, the RFS2 in general and RIN market conditions in particular were not cited as causal factors behind the gasoline price increases during those years. Additionally, the absolute levels of crack spreads in early 2013 have been consistent with crack spreads experienced in 2011 and 2012.

While these calculations involve gasoline prices at the wholesale level, spreads between retail and wholesale gasoline prices did not show any uptrend in January and February. In fact, there has been no discernible trend upward or downward in the retail-to-wholesale spread during the period analyzed since the start of 2011. This implies that changes in prices at the retail level have been driven by market dynamics at the wholesale level.

In fact, the Department of Energy's (DOE) Energy Information Administration (EIA) did not even mention renewable fuels or RINs in an article titled "Gasoline prices have risen since the start of the year" in the February 21 edition of its publication *This Week in Petroleum*.[2] It did, however, cite several factors specific to the petroleum market and the refining industry:

- "The average U.S. retail price for regular motor gasoline has risen 45 cents per gallon since the start of the year, reaching $3.75 per gallon on February 18. Between January 1 and February 19, the price of Brent crude, the waterborne light sweet crude grade that drives the wholesale price of gasoline sold in most U.S. regions, rose about $6 per barrel, or about 15 cents per gallon. A simple calculation, which modestly understates the role of higher crude prices to the extent that crude price increases during December 2012 were still not fully passed through in retail gasoline prices at the start of 2013, suggests that about two-thirds of the rise in gasoline prices since the start of the year reflects higher gasoline crack margins."
- "...[T]his article focuses on some of the major factors behind the increase in gasoline crack spreads. Among these are: planned and unplanned refinery maintenance; the low starting level for gasoline crack spreads going into 2013; preparation for seasonal fuel specification changes; and developments in global product demand that have affected domestic refinery utilization rates, maintenance needs, and product balances. ... Many refineries schedule maintenance early in the year when gasoline demand is seasonally low."
- "The market's reaction to this string of U.S. refinery outages may have been exacerbated by the late-January announcement that Hess Corporation planned to close its 70,000-bbl/d Port Reading refinery at the end of February. ... It should also be noted that Gulf Coast crack spreads have been bolstered by the increases in RBOB prices attributable to the switch to summer-grade gasoline. On the West Coast, refinery maintenance has been particularly heavy."

Calculated Impact on Retail Gasoline Prices

In addition to the analysis above, some straightforward calculations can be used to show that the ongoing impact of elevated RIN prices on retail gasoline prices is not as high as cited in some media reports. In addition to the ethanol consumption forecast discussed above, the following are key assumptions to the calculations:

- The year-to-date average daily price of a conventional ethanol RIN has been $0.37; this is used as the assumed RIN price in a "reference case" calculation of the impact on gasoline prices. The average price for a conventional ethanol RINs from March 1-22 has been $0.79 – by far a monthly record – and accordingly this is used in a "high case" calculation. It should be noted that prices in the high case are far above any experienced in the history of RIN trading, and that an average daily price above $0.79 has occurred only four times

[2] http://www.eia.gov/oog/info/twip/twiparch/2013/130221/twipprint.html

during the 14 business days of the month and only once since feverish buying caused prices to spike to their all-time high of $1.06 on March 11. (The average price on March 22 was $0.67.)

- Not all of the 13.8 bil. RINs required for RFS2 compliance in 2013 need to be purchased on the open market at elevated prices, which is a key reason why the RIN price impact will be less than claimed in some media reports. A sizable portion of RINs are obtained by obligated parties directly through ethanol purchases/blending or indirectly via contractual relationships with independent blenders. Based on market research and conversations with industry participants, Informa estimates that 70-85% of the RINs attached to ethanol used in the supply chain are directly "separated" or indirectly transferred to obligated parties. Given this situation, it is likely that obligated parties hold a large majority of the excess RIN inventories that existed at the end of 2012 and can be applied to the 2013 obligation (amassed at a time when open-market RIN prices were far lower than in 2013).

- Accordingly, in the high case it is assumed that only 70% of ethanol RINs are "separated" by or otherwise conveyed to obligated parties (the remaining 30% would have to be purchased on the open market) and that only 70% of banked RINs are held by obligated parties, while in the reference case it is assumed that these shares are higher, at 85%. Given that it is likely that by the end of the year obligated parties had amassed an even higher share of the excess RIN inventories that existed at the end of 2012, it is assumed in the high case that obligated parties held 77.5% of the 2012 yearend inventories (the midpoint of 70% and 85%). The premise that only a moderate share of RINs needed for compliance have to be purchased on the open market is supported by statements by representatives of the petroleum industry:
  - In a March 12, 2013 security analyst meeting, Chevron Corporation Executive Vice President of Downstream & Chemicals, Mike Wirth, stated, "Specifically to Chevron's position, … we tend to have more marketing sales and therefore more blending of fuels that we sell than we do refining production. So we're in natural long position on RINs … So we can satisfy our compliance obligation and still have some excess that we can sell into the market."
  - Based on communications with the American Fuel and Petrochemical Manufacturers, a March 16 CNBC report stated, "Some companies have a surplus [of RINs]. But those without them have rushed into a market that is thinly traded, driving the spike in prices."[3]

- It is assumed that all of the costs and benefits associated with ethanol usage and RIN purchases are passed along through the supply chain to consumers. While this is assumed, in reality it is likely that a significant share of the costs and benefits are absorbed by participants in the supply chain, lessening the impact on consumers.

- Consumption of finished motor gasoline will be 133.4 billion gallons in 2013, based on the "Short-Term Energy Outlook" published by the Department of Energy's Energy Information Administration.

Based on these assumptions, the direct effect on retail gasoline prices associated with RIN costs would be only $0.004 per gallon in the reference case and would be a maximum $0.02 per gallon in the high case. Still assuming full pass-through of costs to consumers but otherwise

[3] CNBC, "Ethanol Surplus May Lift Gas Prices." http://www.cnbc.com/id/100560109

varying the assumptions described above would result in direct effects of between \$0.00 4 and \$0.02 per gallon (see Exhibit 2).

Exhibit 2: Calculated 2013 Ethanol/RIN Impact on Retail Gasoline Prices

Cost Associated with Open Market Purchases of RINs		High Case	Reference Case	
Est. Conventional Ethanol (D6) RIN Inventory at End of 2012	bil.	2.1	2.1	
% Held by Obligated Parties	%	77.5%	85%	*(a)*
D6 RIN Inventory Held by Obligated Parties at End of 2012	bil.	1.6	1.8	
2013 Conventional Ethanol Consumption	bil. gal.	12.5	12.5	
% of 2013 RINs Separated by or Indirectly Controlled by by Obligated Parties	%	70%	85%	*(a)*
RINs Controlled Obligated Parties Through 2013 Ethanol Consumption	bil.	8.8	10.6	
Total D6 RINs Held or Controlled by Obligated Parties in 2013	**bil.**	**10.4**	**12.4**	
2013 RFS Allocation for Conventional Ethanol	bil. gal.	13.8	13.8	
RINs to Be Purchased on Open Market in 2013 by Obligated Parties	**bil.**	**3.4**	**1.4**	
Open Market Price per RIN (High Case Is Record High 3/13 Monthly Avg.)	\$/RIN	\$ 0.79	\$ 0.37	*(b)*
Aggregate Cost of Open Market RIN Purchases by Obligated Parties	**bil. \$**	**\$ (2.72)**	**\$ (0.53)**	
Finished Motor Gasoline Consumption	bil. gal.	133.4	133.4	*(c)*
Per-Gallon Cost of Open Market RIN Purchases by Obligated Parties	**\$/gal**	**(0.02)**	**(0.004)**	
Assumed % of Wholesale Cost or Benefit Passed through to Retail	%	100%	100%	
Per-Gallon Cost Impact on Retail Gasoline Price	**\$/gal**	**(0.02)**	**(0.004)**	
Benefit from Usage of Physical Ethanol Versus Gasoline				
Year-to-Date Avg. Ethanol Price	\$/gal	2.37	2.37	*(d)*
Year-to-Date Avg. RBOB Unleaded Gasoline Price	\$/gal	2.81	2.81	*(d)*
Year-to-Date Avg. Ethanol Price Advantage	\$/gal	0.44	0.44	
2013 Conventional Ethanol Consumption	bil. gal.	12.5	12.5	
Aggregate Benefit from Usage of Physical Ethanol Versus Gasoline	**bil. \$**	**\$ 5.52**	**\$ 5.52**	
Finished Motor Gasoline Consumption	bil. gal.	133.4	133.4	*(c)*
Per-Gallon Benefit from Usage of Physical Ethanol Versus Gasoline	**\$/gal**	**0.04**	**0.04**	
Assumed % of Wholesale Cost or Benefit Passed through to Retail	%	100%	100%	
Per-Gallon Retail Gasoline Price Benefit	**\$/gal**	**0.04**	**0.04**	
Net Impact on Retail Price of Gasoline				
Aggregate Net Benefit (Cost) Assoc. w/ Ethanol Use = Ethanol Savings - RIN Cost	bil. \$	\$ 2.80	\$ 4.99	
Finished Motor Gasoline Consumption	bil. gal.	133.4	133.4	*(c)*
Per-Gallon Net Benefit of Ethanol Use	\$/gal	0.02	0.04	
Assumed % of Wholesale Cost or Benefit Passed through to Retail	%	100%	100%	
Per-Gallon Retail Gasoline Price Benefit (Cost) from Usage of Ethanol	**\$/gal**	**0.02**	**0.04**	

Source: Informa Economics, except as noted
(a) Based on conversations with industry participants, it is estimated that 70%-85% of RINs are obtained by obligated parties directly through ethanol purchases/blending or indirectly via contractual relationships with independent blenders. The share of RIN inventories held by obligated parties is likely higher.
(b) Max ytd. daily avg. for a 2013 RIN. Source: OPIS.
(c) Department of Energy - Energy Information Administration, "Short-Term Energy Outlook"
(d) Ytd. weekly avg. Chicago ethanol spot price and Chicago RBOB unleaded spot price. Source: OPIS.

However, focusing only on RIN prices provides only part of the picture of the impact of ethanol on gasoline prices paid by consumers. In particular, ethanol prices have usually been substantially below gasoline prices at the wholesale level in recent years. Thus far in 2013, ethanol prices in Chicago have averaged \$2.37 per gallon, while gasoline prices have averaged \$2.81 per gallon in Chicago (wholesale prices in Chicago were utilized since it is the central pricing point for ethanol and since the regulatory conditions for gasoline are not as varied as on the East and West Coasts). This 44 cent -per-gallon discount translates to a gross benefit of

$0.04 per gallon of finished motor gasoline supplied to consumers. This does not take into account either the indirect benefit that ethanol has on gasoline prices by effectively lowering demand for clear gasoline (a benefit especially in past years when refineries were running close to capacity) or the enhanced octane value of ethanol over gasoline, given that ethanol has an octane rating of 113 whereas premium gasoline is 93 octane and regular unleaded gasoline is 87 octane (allowing a higher price to be charged for premium gasoline or a lower-cost sub-octane blendstock to be used in producing regular gasoline).

Considering both the ethanol price advantage and the direct cost of currently elevated RIN prices, there is actually a net benefit to consumers of $0.04 per gallon in the reference case and $0.02 per gallon in the high case associated with the usage of ethanol within RFS2. Still, it should be noted that costs in the high case are in some regards a logical extreme, based on record-high RIN prices, conservative assumptions about the share of RINs that are directly separated or otherwise controlled by obligated parties and the assumption that 100% of costs are passed through to the consumer.

A Final Note: Ethanol Prices versus RIN Prices

The relative prices of ethanol and RINs also might reflect the modest share of RINs not controlled by obligated parties and the associated thin nature of the open market for which record-high RIN prices have recently been reported. The weekly average price of a conventional ethanol RIN generated in 2013 has increased by $0.76 since the start of the year (see Exhibit 3). On the other hand, the Chicago spot price of ethanol has increased by a far more modest $0.19 per gallon; moreover, given that corn prices have increased by $0.30 per bushel since the start of the year and one bushel of corn yield approximately 2.8 gallons of ethanol, $0.11 per gallon of the ethanol price move can be "explained" by the increase in production costs.

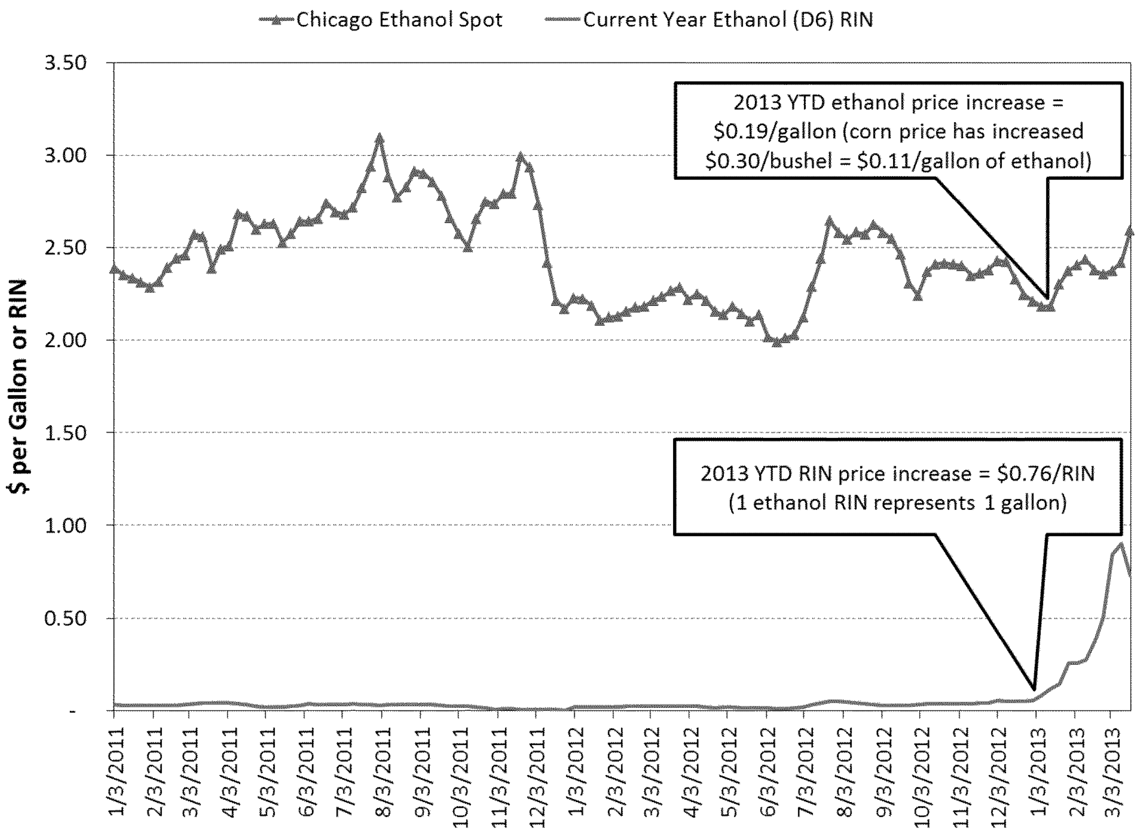
Each gallon of ethanol for which prices are reported still has a RIN attached, so if the "true" value of a RIN were equivalent to the reported market price in early 2013, it would be expected that this also would be reflected in the ethanol price. However, the price of a gallon of ethanol – the volume of which likely has been far higher than the number of RINs traded – has not increased nearly as much as the reported price of a RIN.

It is recognized that with the effective RFS2 allocation to conventional ethanol in 2013 higher than both the blend wall and the likely volume of production, a separated RIN (i.e., not attached to a physical gallon of ethanol) is worth more than an attached one. However, it is questionable whether the increase in the RIN price should be more than three times the increase in the ethanol price.

Conclusion

A fact-based review of developments in the gasoline, ethanol and RIN markets indicates that the Renewable Fuel Standard in general and RINs in particular have not been a demonstrable factor in the rise in retail gasoline prices that has occurred in early 2013.

Exhibit 3: Ethanol and RIN Price History



Source: OPIS